

KIC 008499639

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008499639-01 | OBS | No | 2.033062 | 132.059197 | 70.5 | 15.646 | 13.9 | 13.3 | 1.64 | 6794 | 1.62 | 4393.17 |
| 008499639-02 | OBS | No | 12.183893 | 135.460041 | 483.9 | 3.715 | 12.9 | 15.1 | 1.64 | 6794 | 4.09 | 403.58 |
| 008499639-03 | OBS | No | 5.675408 | 132.308997 | 552.9 | 0.997 | 13.4 | 14.7 | 1.64 | 6794 | 3.96 | 1117.68 |
| 008499639-04 | OBS | No | 136.228542 | 137.111846 | 357.9 | 2.194 | 8.3 | 10.1 | 1.64 | 6794 | 3.14 | 16.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008499639-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_SATURATED |
| 008499639-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 008499639-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED |
| 008499639-04 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

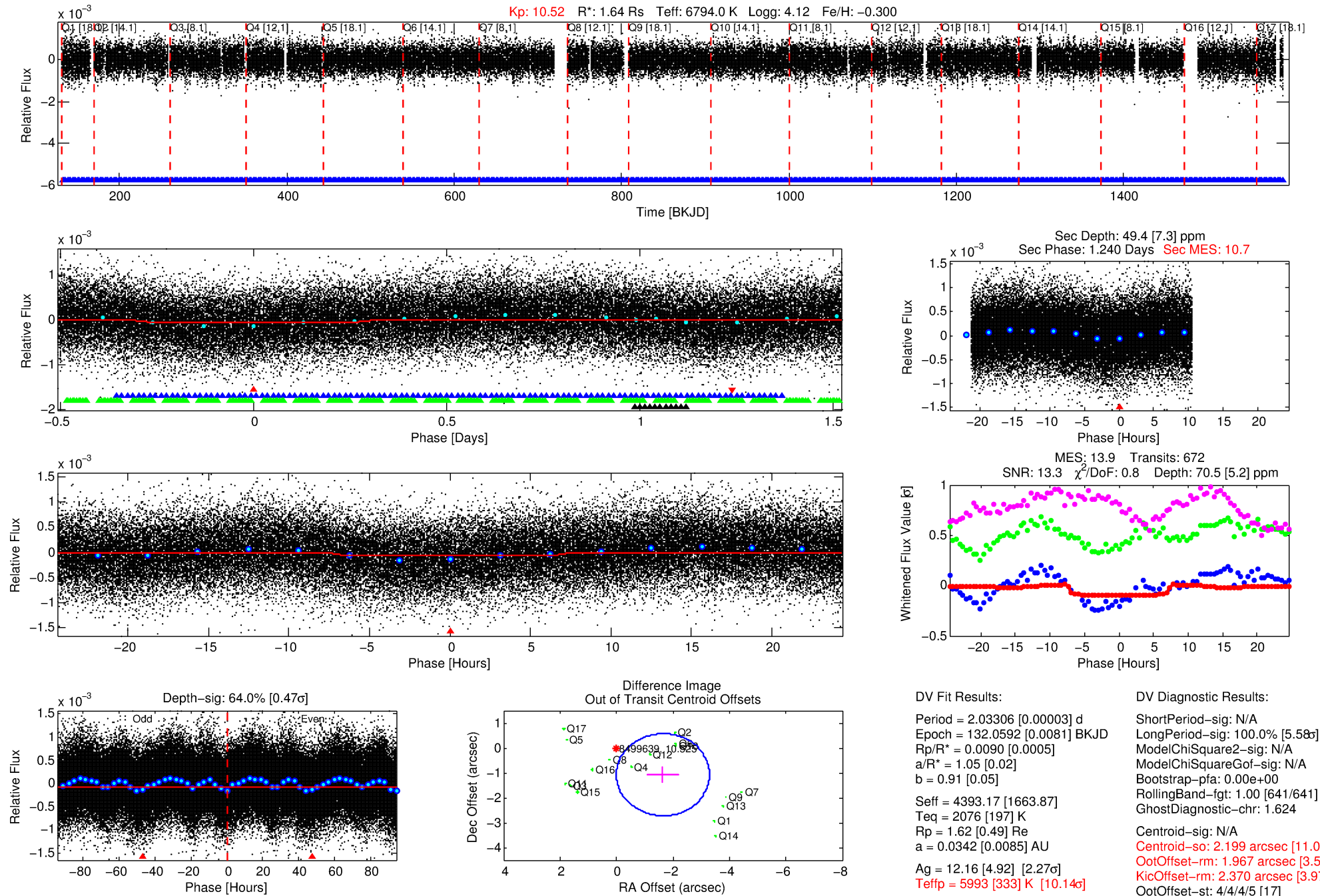
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008499639-01

No Significant Match Found

DV One-Page Summary

KIC: 8499639 Candidate: 1 of 4 Period: 2.033 d



DV Fit Results:

Period = 2.03306 [0.00003] d
Epoch = 132.0592 [0.0081] BKJD
Rp/R* = 0.0090 [0.0005]
a/R* = 1.05 [0.02]
b = 0.91 [0.05]
Seff = 4393.17 [1663.87]
Teq = 2076 [197] K
Rp = 1.62 [0.49] Re
a = 0.0342 [0.0085] AU
Ag = 12.16 [4.92] [2.27σ]
Teffp = 5993 [333] K [10.14σ]

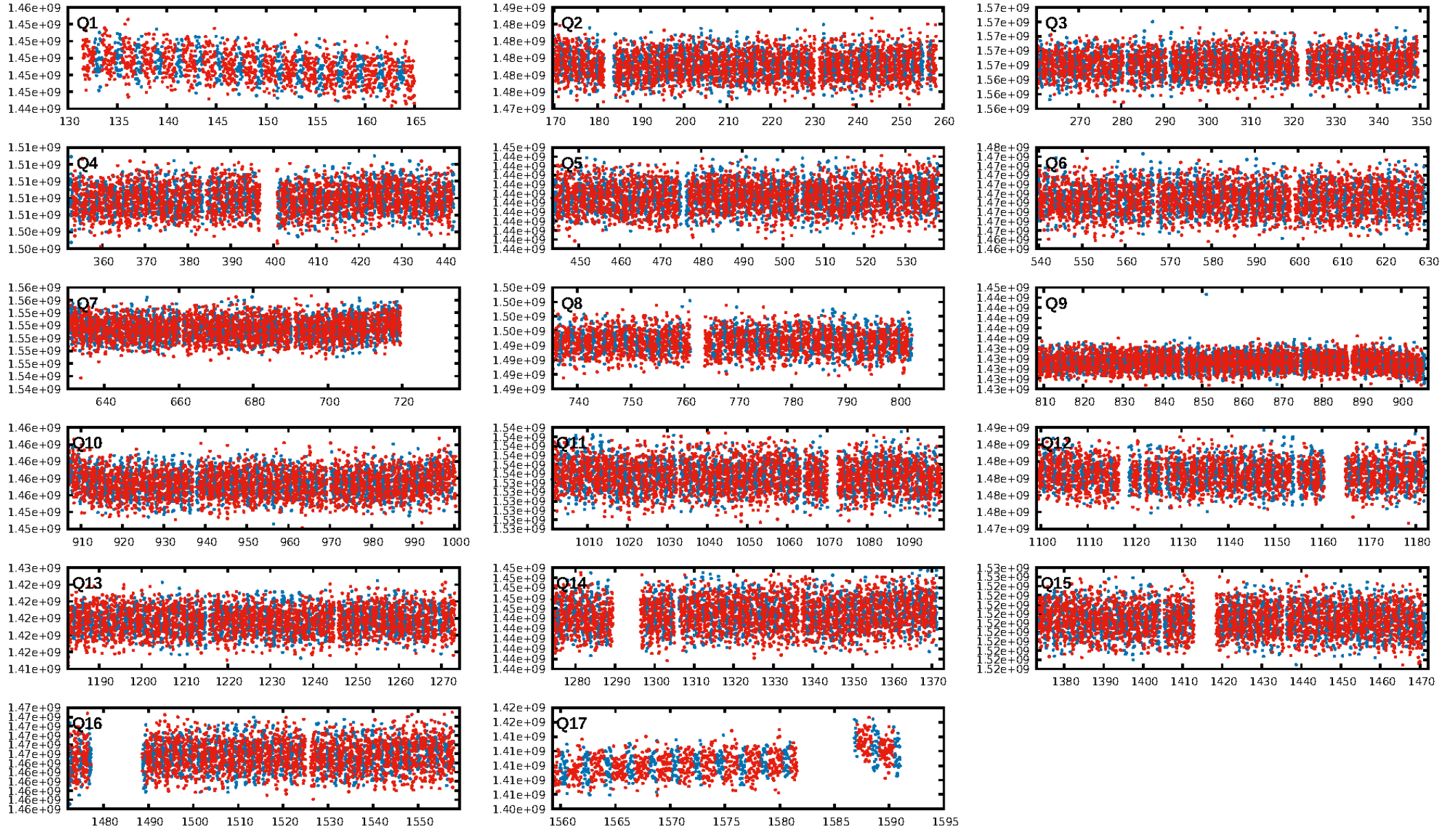
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [5.58σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [641/641]
GhostDiagnostic-chr: 1.624
Centroid-sig: N/A
Centroid-so: 2.199 arcsec [11.05σ]
OotOffset-rm: 1.967 arcsec [3.58σ]
KicOffset-rm: 2.370 arcsec [3.97σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.53 [9/17]
DiffImageOverlap-fno: 1.00 [17/17]

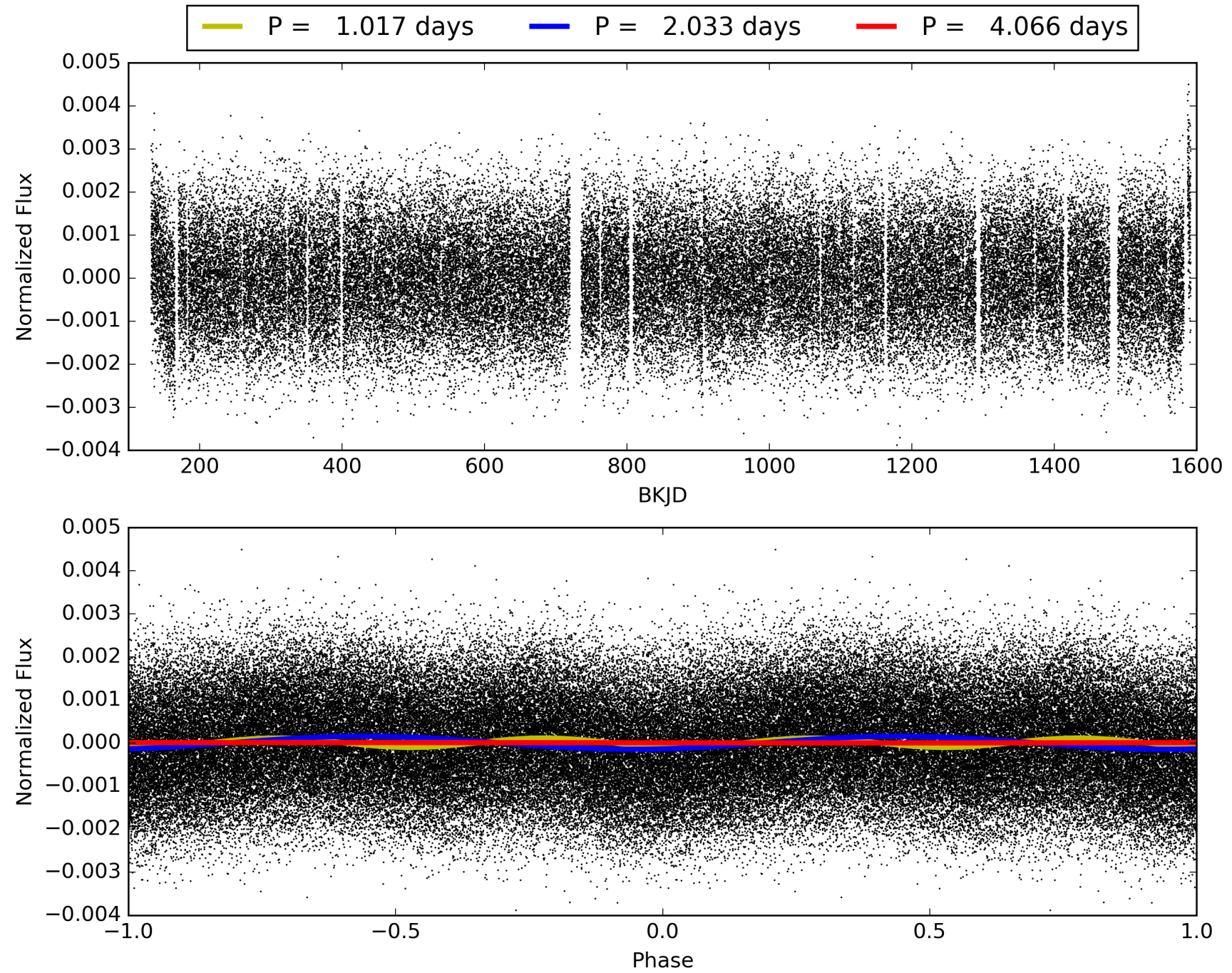
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:49:41 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008499639-01, PDC Light Curves

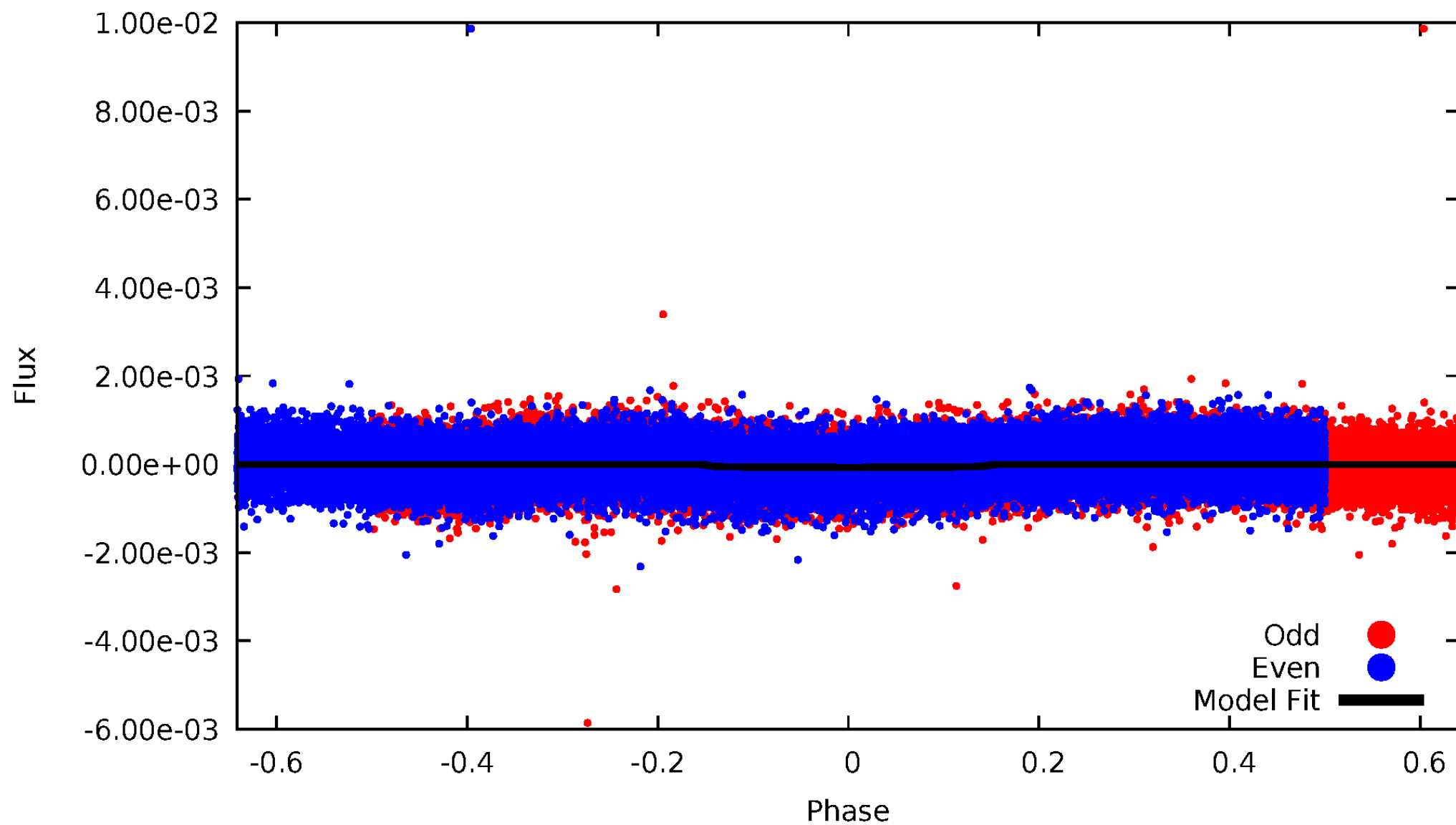


TCE 008499639-01



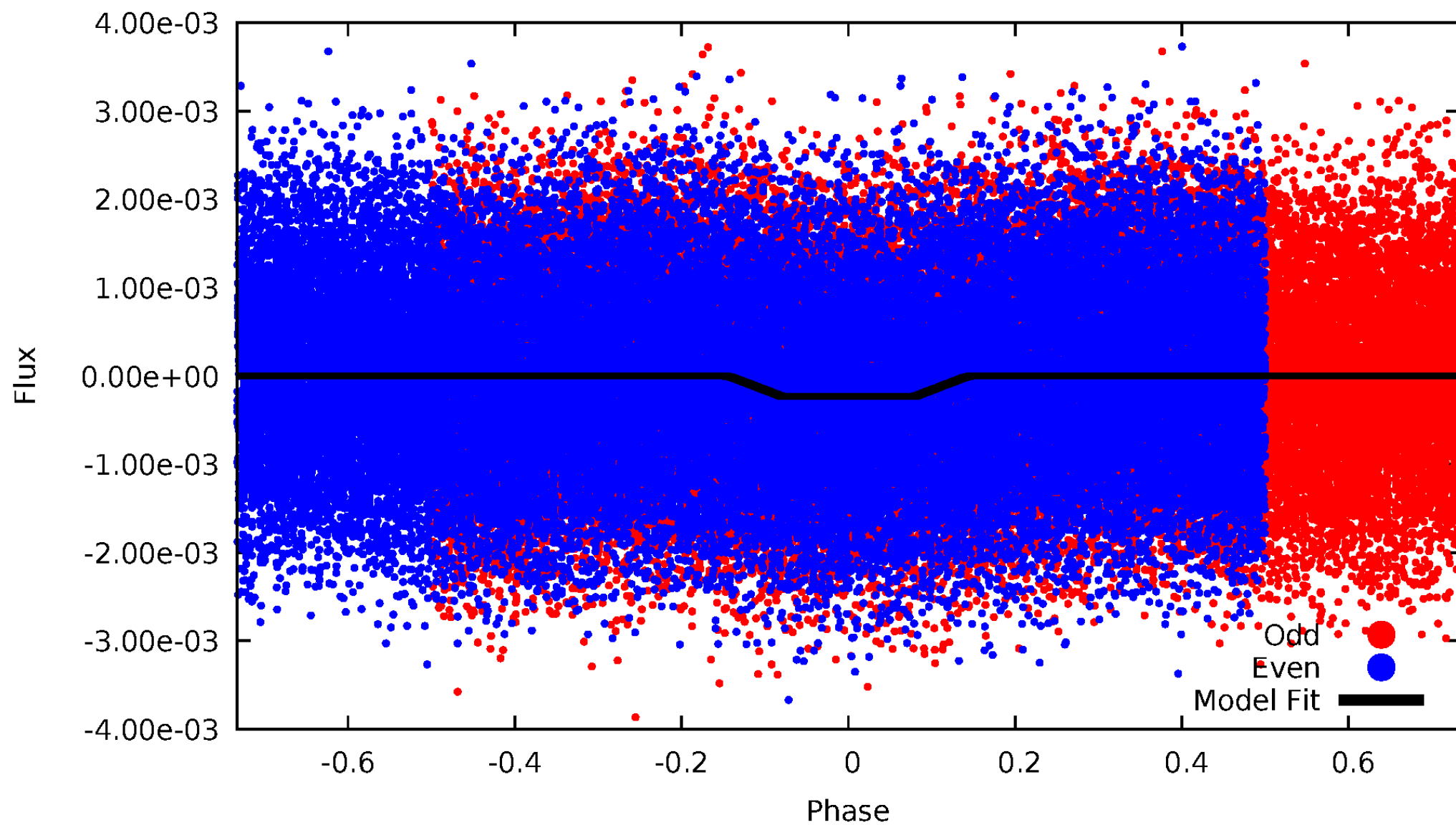
DV Odd/Even

TCE 008499639-01



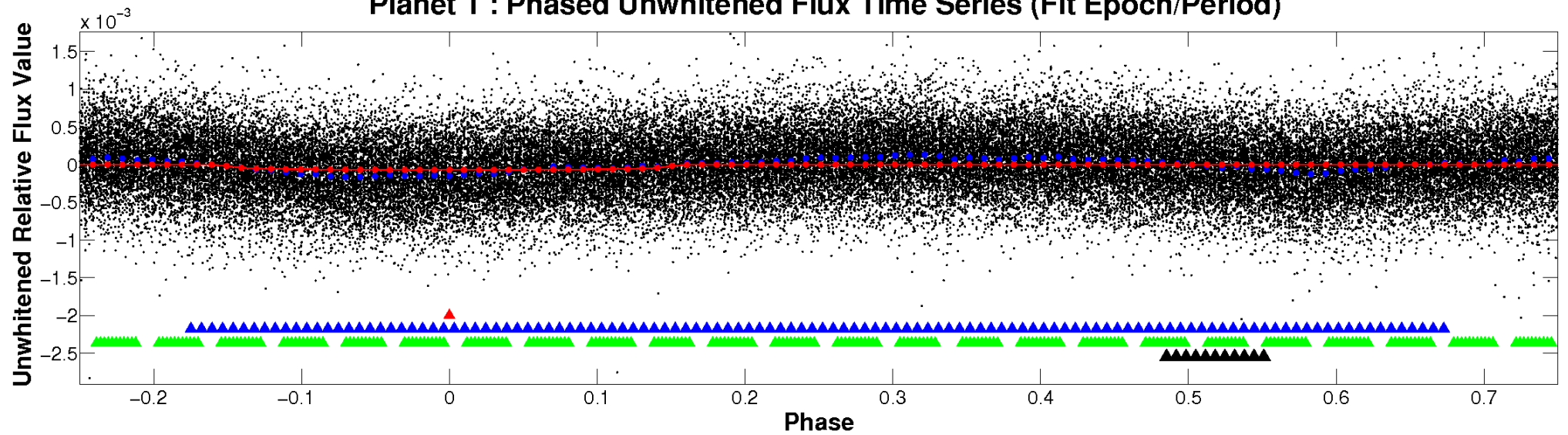
ALT Odd/Even

TCE 008499639-01

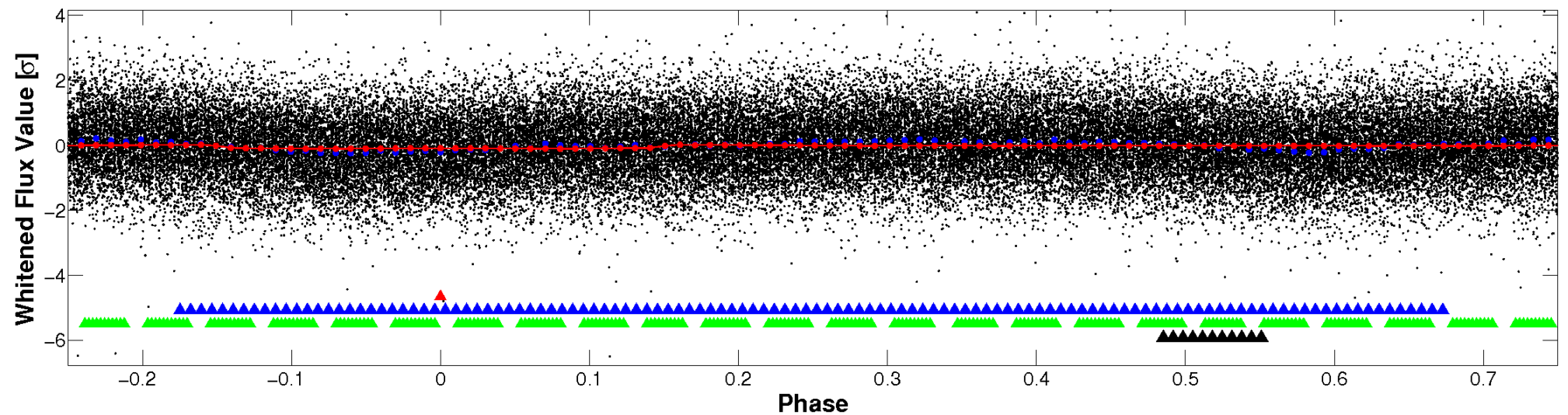


Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

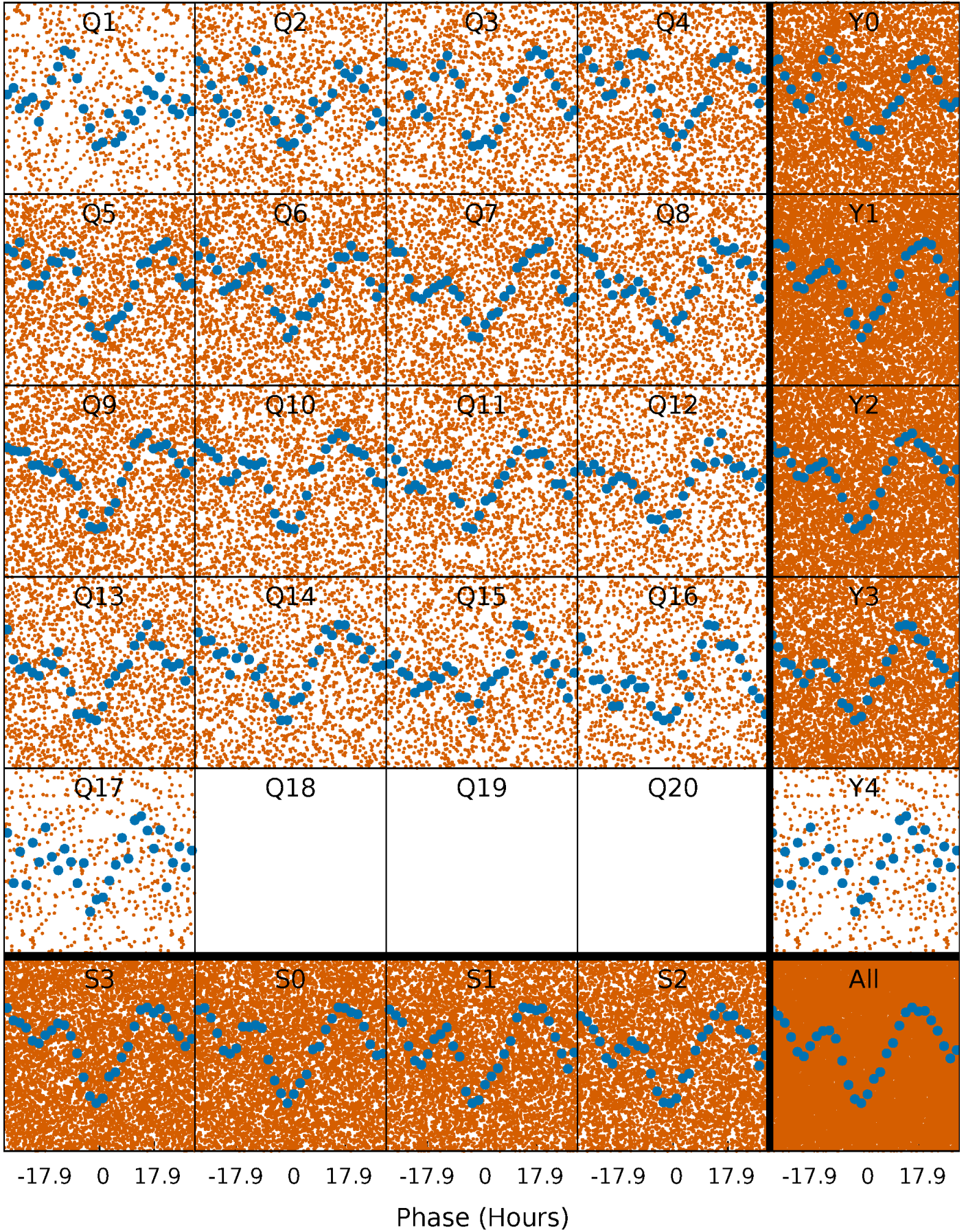


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



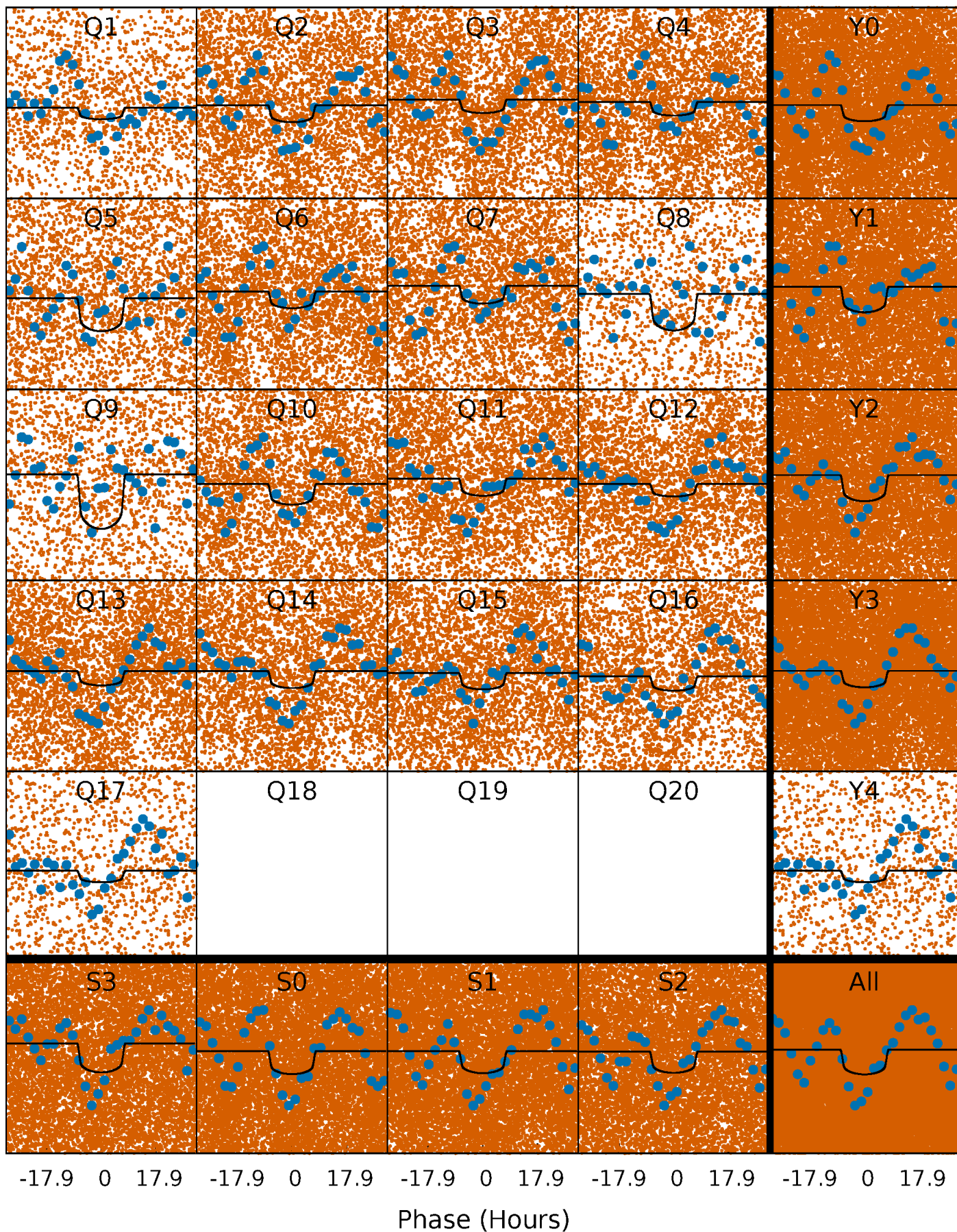
PDC Quarter-Phased Transit Curves

TCE 008499639-01 P= 2.033062 Days $T_0=132.059197$ (BKJD)



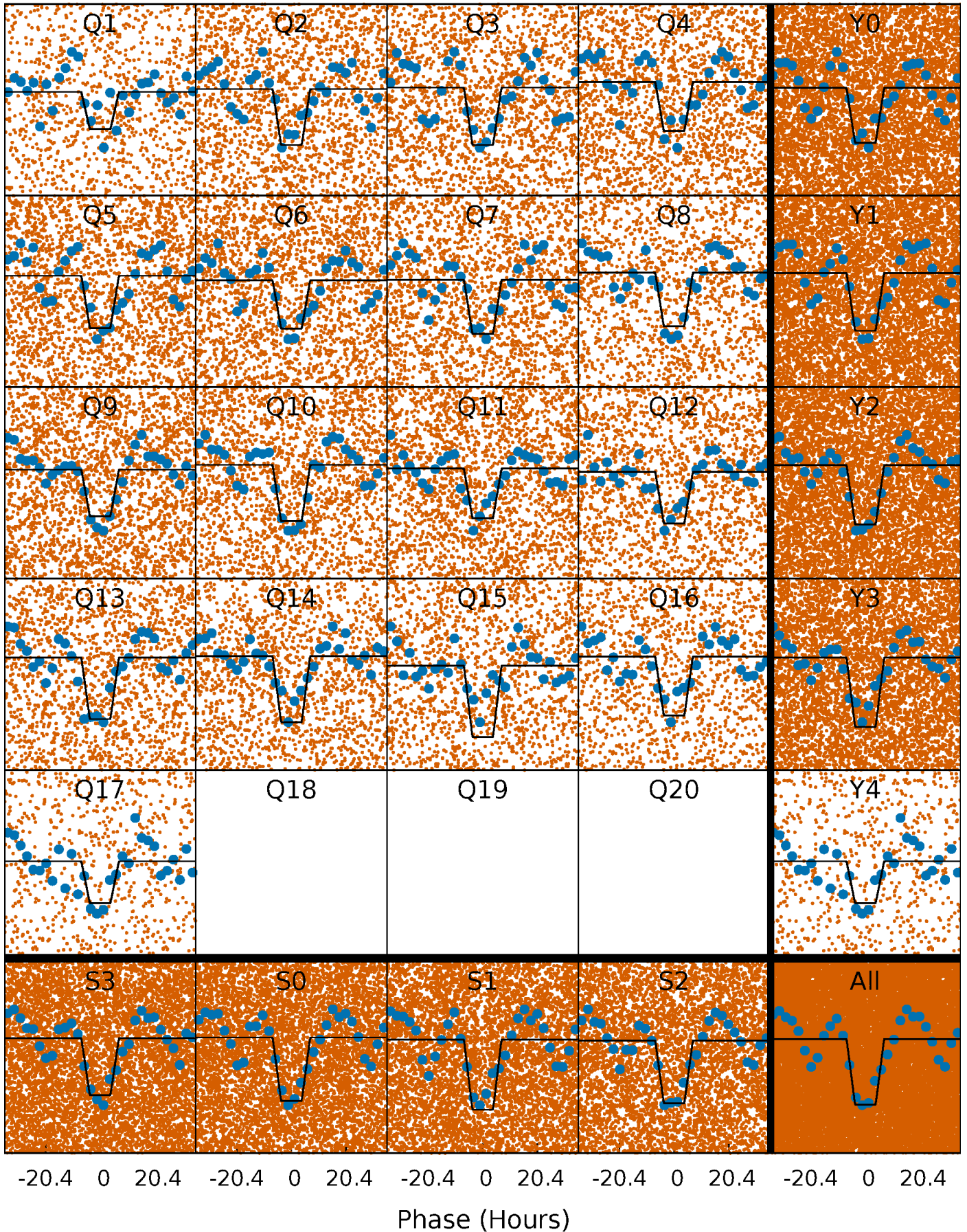
DV Quarter-Phased Transit Curves

TCE 008499639-01 P= 2.033062 Days $T_0=132.059197$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

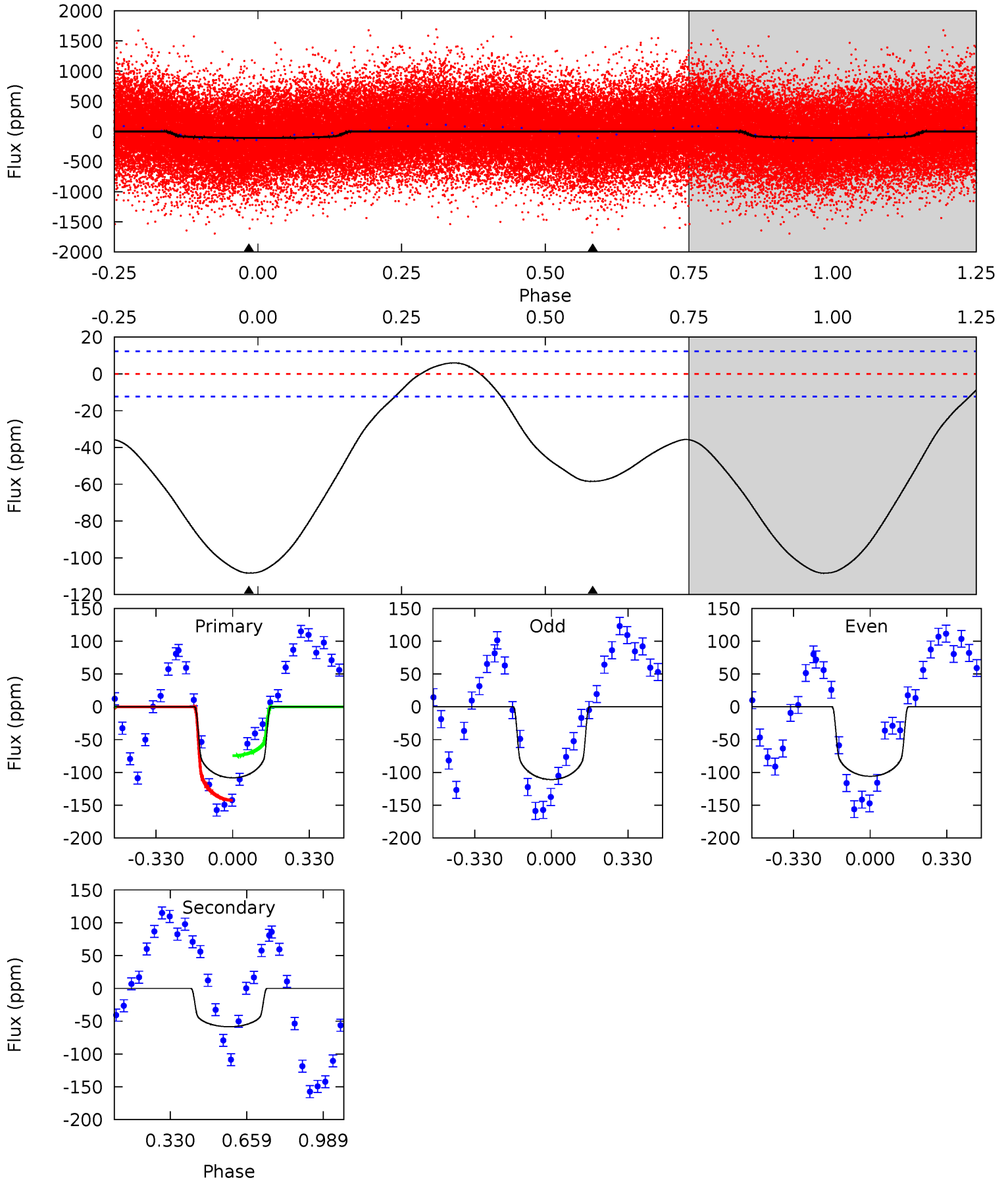
TCE 008499639-01 P= 2.033030 Days $T_0=132.035969$ (BKJD)



DV Model-Shift Uniqueness Test

008499639-01, P = 2.033062 Days, E = 130.026135 Days

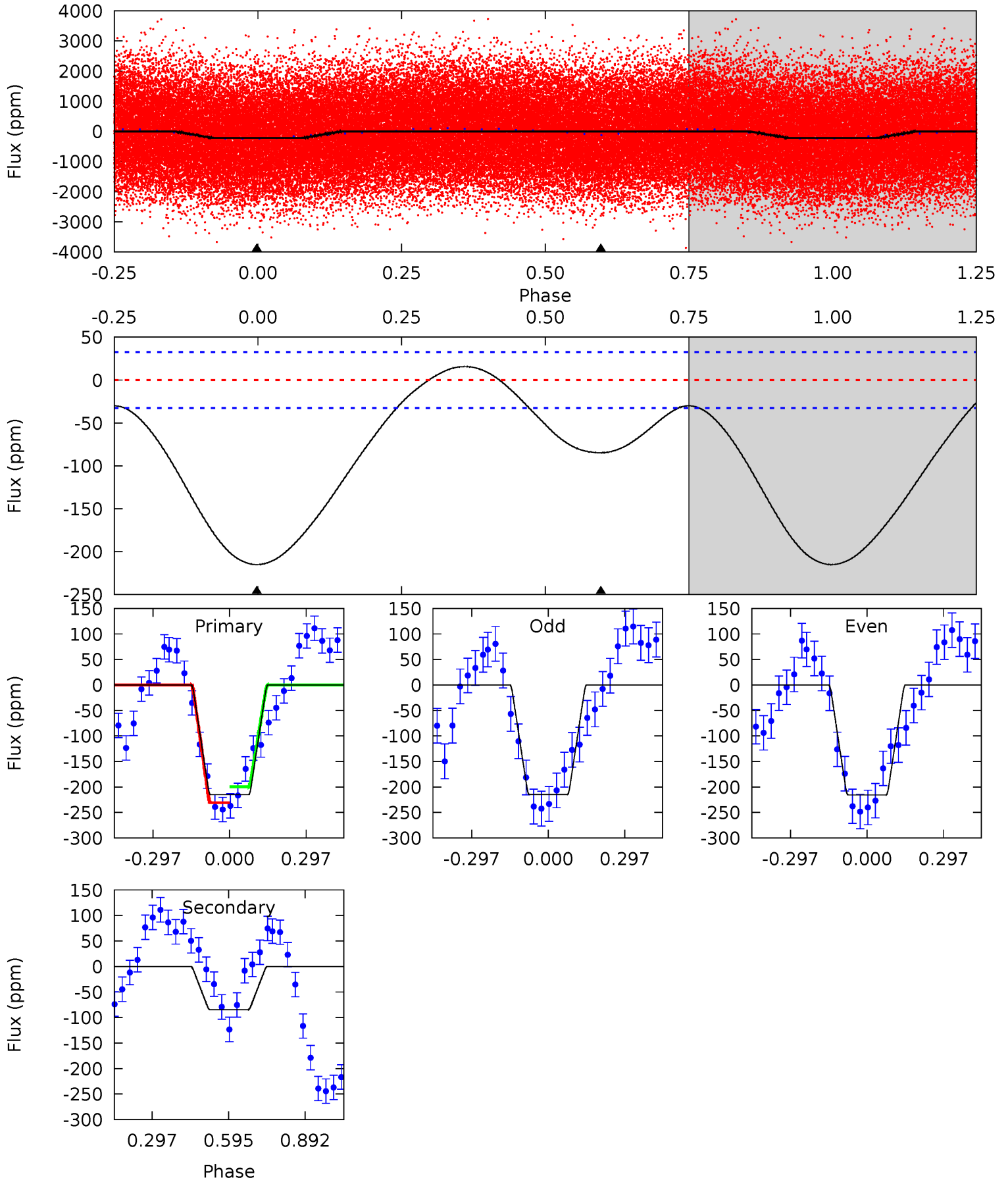
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 38.0 | 20.5 | 0 | 0 | 4.31 | 0.97 | 2.09 | 38.0 | 38.0 | 20.5 | 20.5 | 0.87 | 1.00 | 0.05 | 12.1 |



Alt Model-Shift Uniqueness Test

008499639-01, P = 2.033030 Days, E = 130.002939 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.5 | 11.2 | 0 | 0 | 4.33 | 1.04 | 1.68 | 28.5 | 28.5 | 11.2 | 11.2 | 0.05 | 1.00 | 0.07 | 2.07 |



Stellar Parameters For KIC 008499639

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6794^{+170}_{-204} | $4.119^{+0.195}_{-0.175}$ | $-0.300^{+0.300}_{-0.300}$ | $1.642^{+0.489}_{-0.444}$ | $1.298^{+0.182}_{-0.223}$ | $0.413^{+0.476}_{-0.189}$ |
| | +3%/-3% | +5%/-4% | +100%/-100% | +30%/-27% | +14%/-17% | +115%/-46% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008499639-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -58 ± 3 | $1.60^{+0.29}_{-0.23}$ | 2891^{+230}_{-198} | 6189^{+264}_{-252} | 14^{+5}_{-4} |
| Alt. | -85 ± 8 | $2.73^{+0.49}_{-0.41}$ | 2892^{+232}_{-196} | 5246^{+183}_{-187} | $7.200^{+2.546}_{-1.884}$ |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

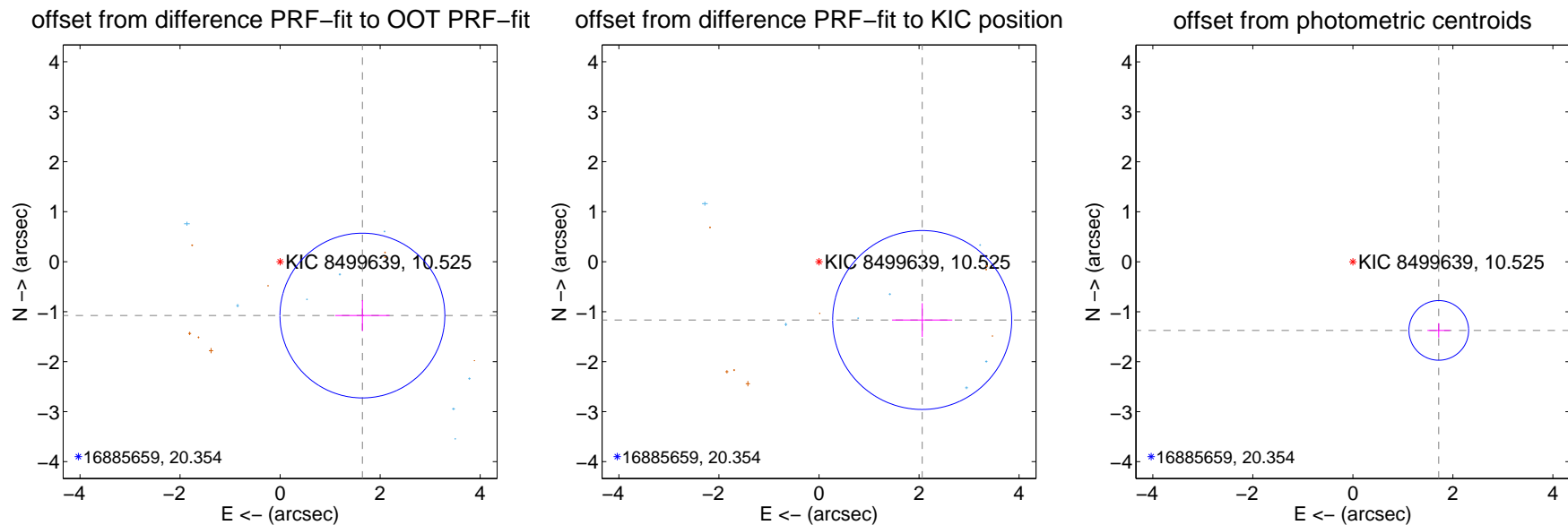
DV Centroid Data

Supplemental centroid analysis for 008499639-01. **Kepler magnitude: 10.53.** Transit SNR 13.28

There are 9 quarters with good PRF difference image offsets

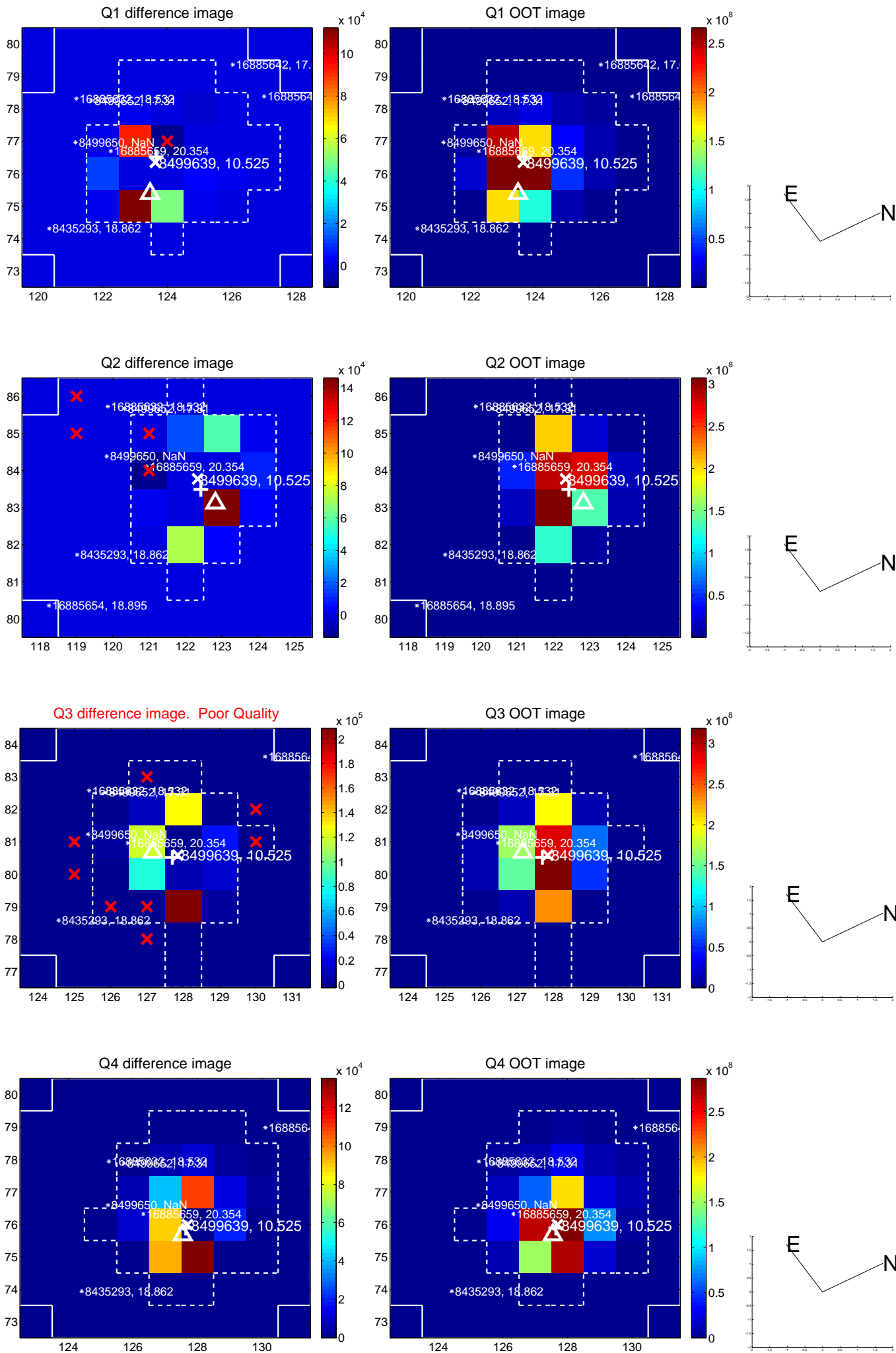
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 1.967 ± 0.549 | 3.58 | -1.645 ± 0.542 | -1.077 ± 0.309 |
| PRF-fit source offset from KIC position | 2.370 ± 0.597 | 3.97 | -2.063 ± 0.603 | -1.167 ± 0.337 |
| photometric centroid source offset | 2.20 ± 0.20 | 11.05 | -1.72 ± 0.23 | -1.37 ± 0.15 |

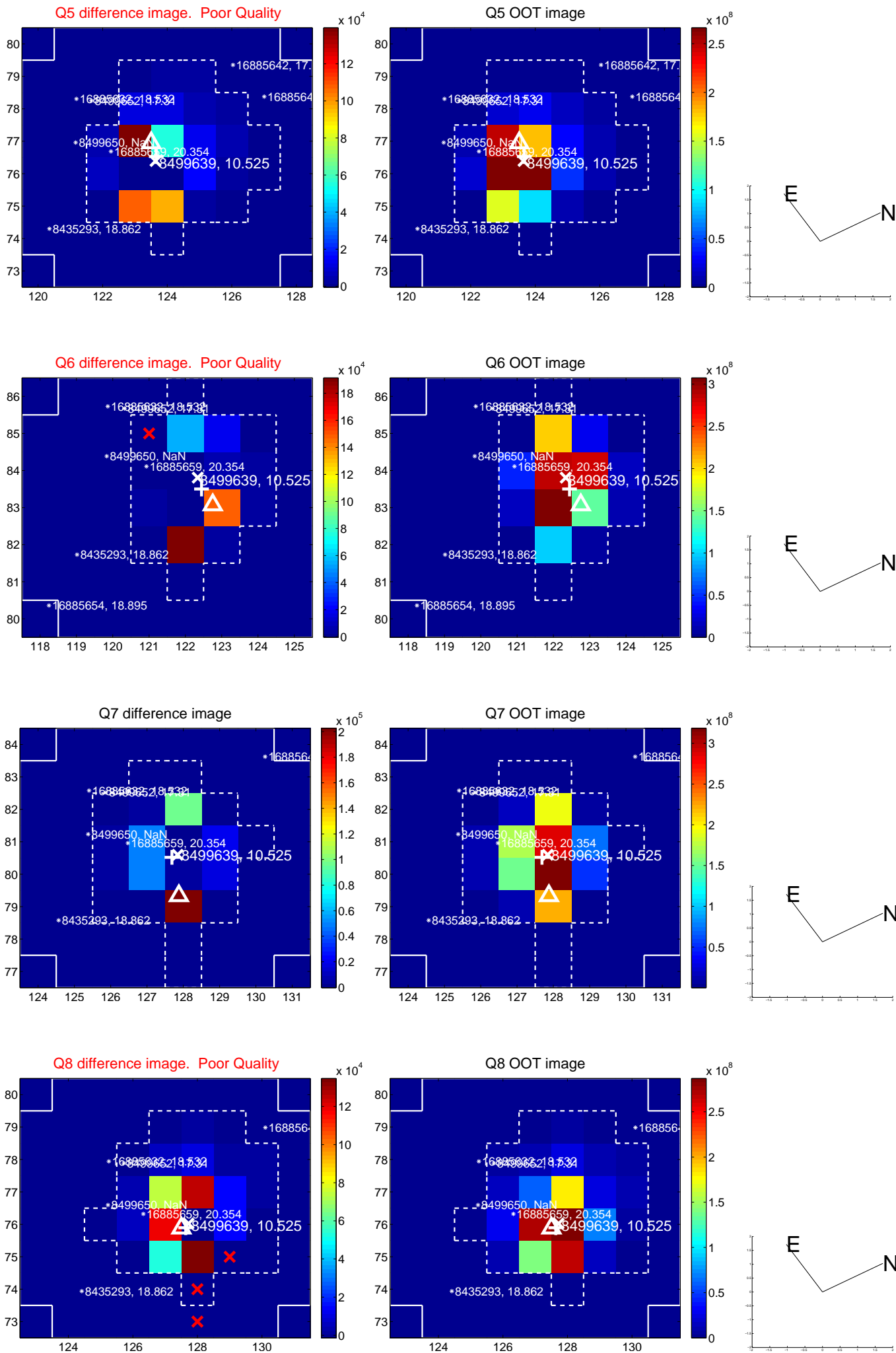


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

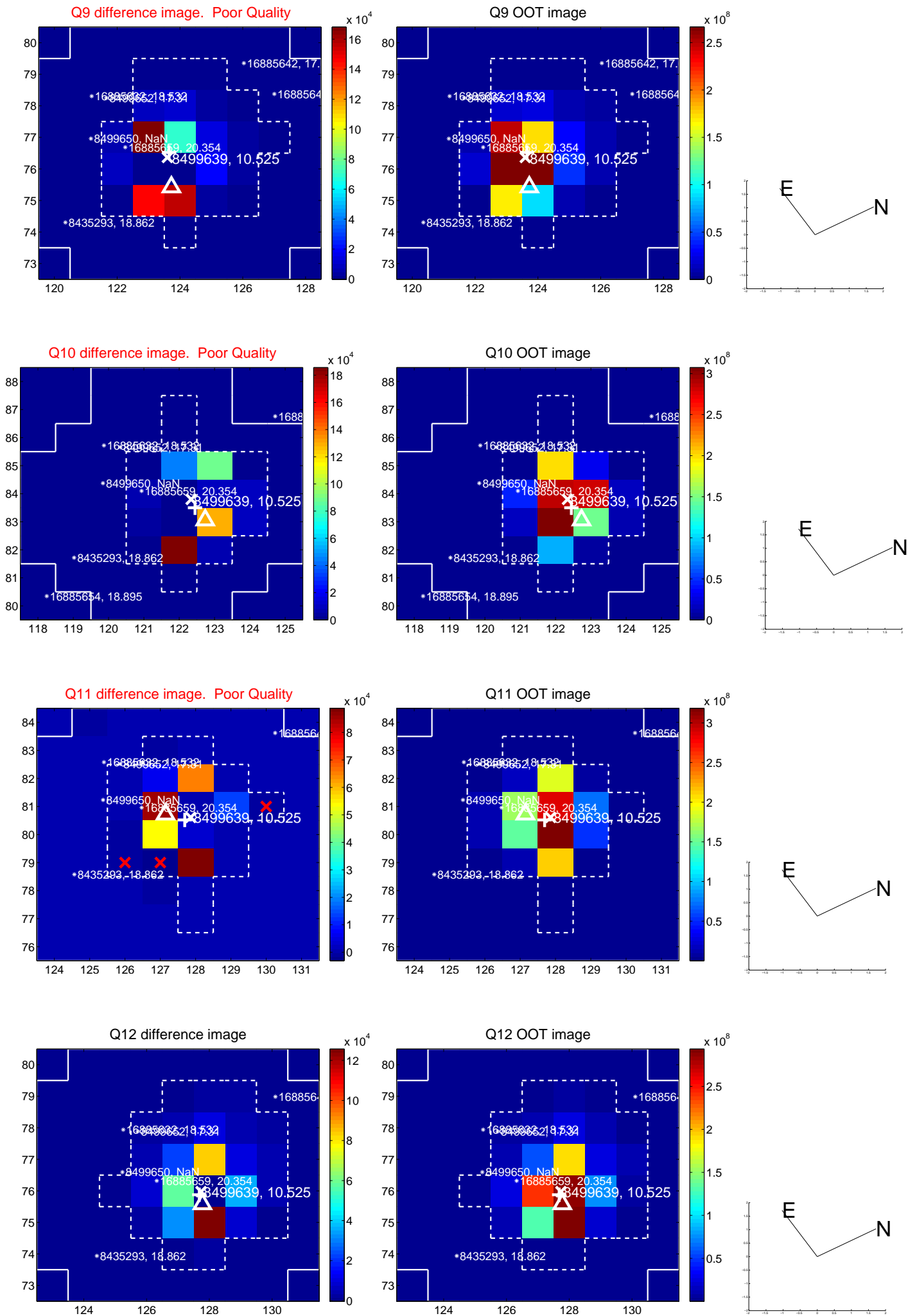
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



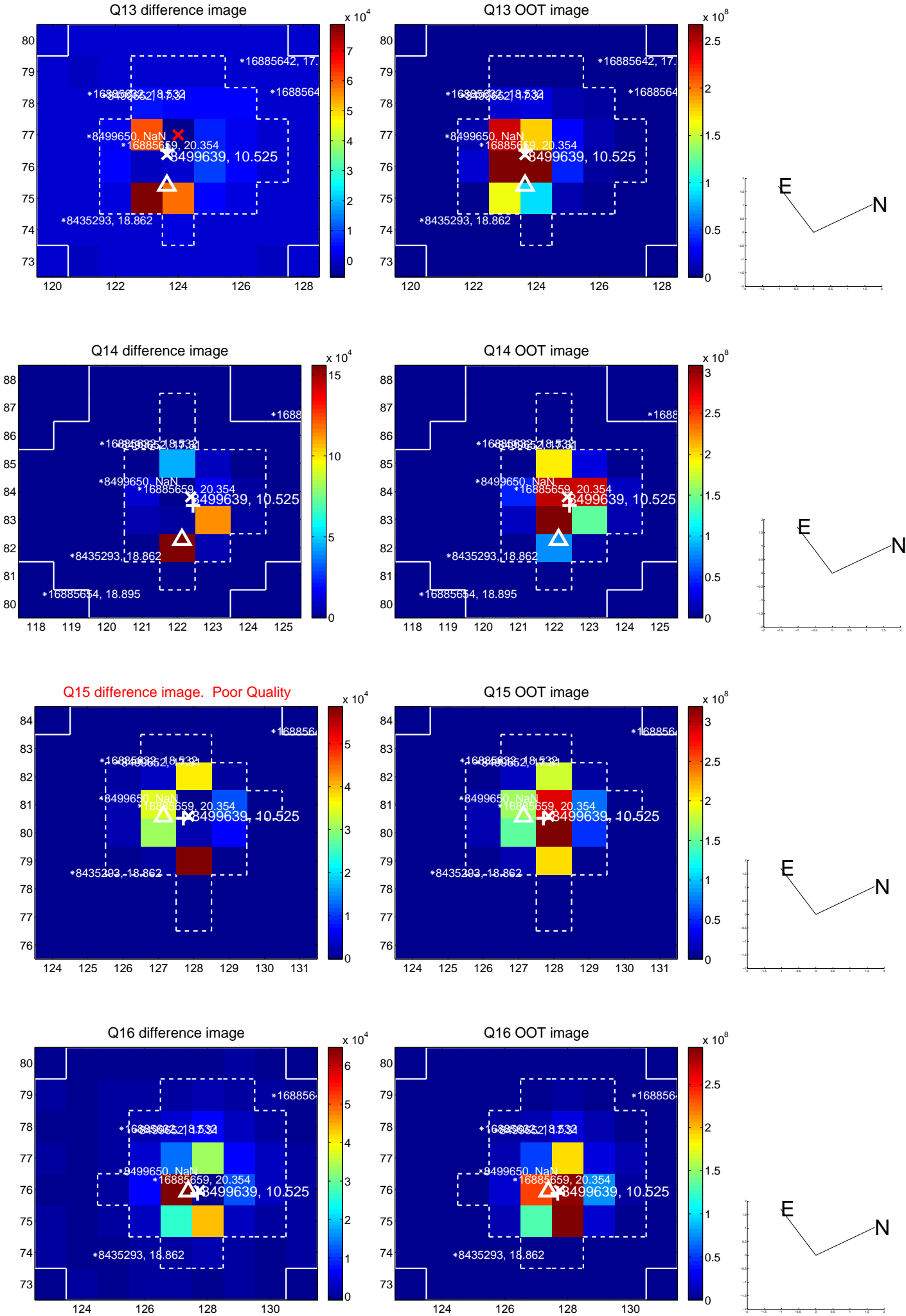
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



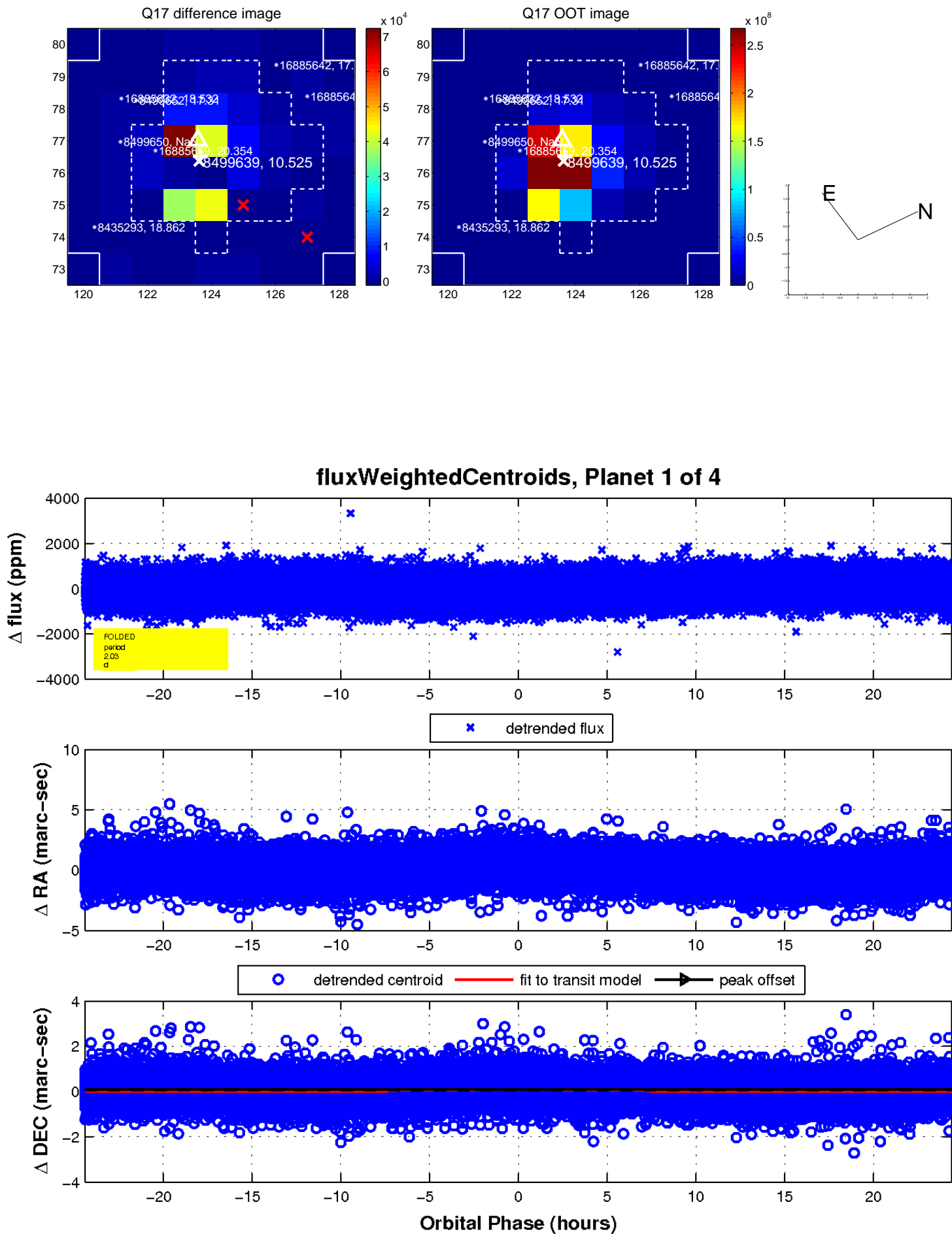
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



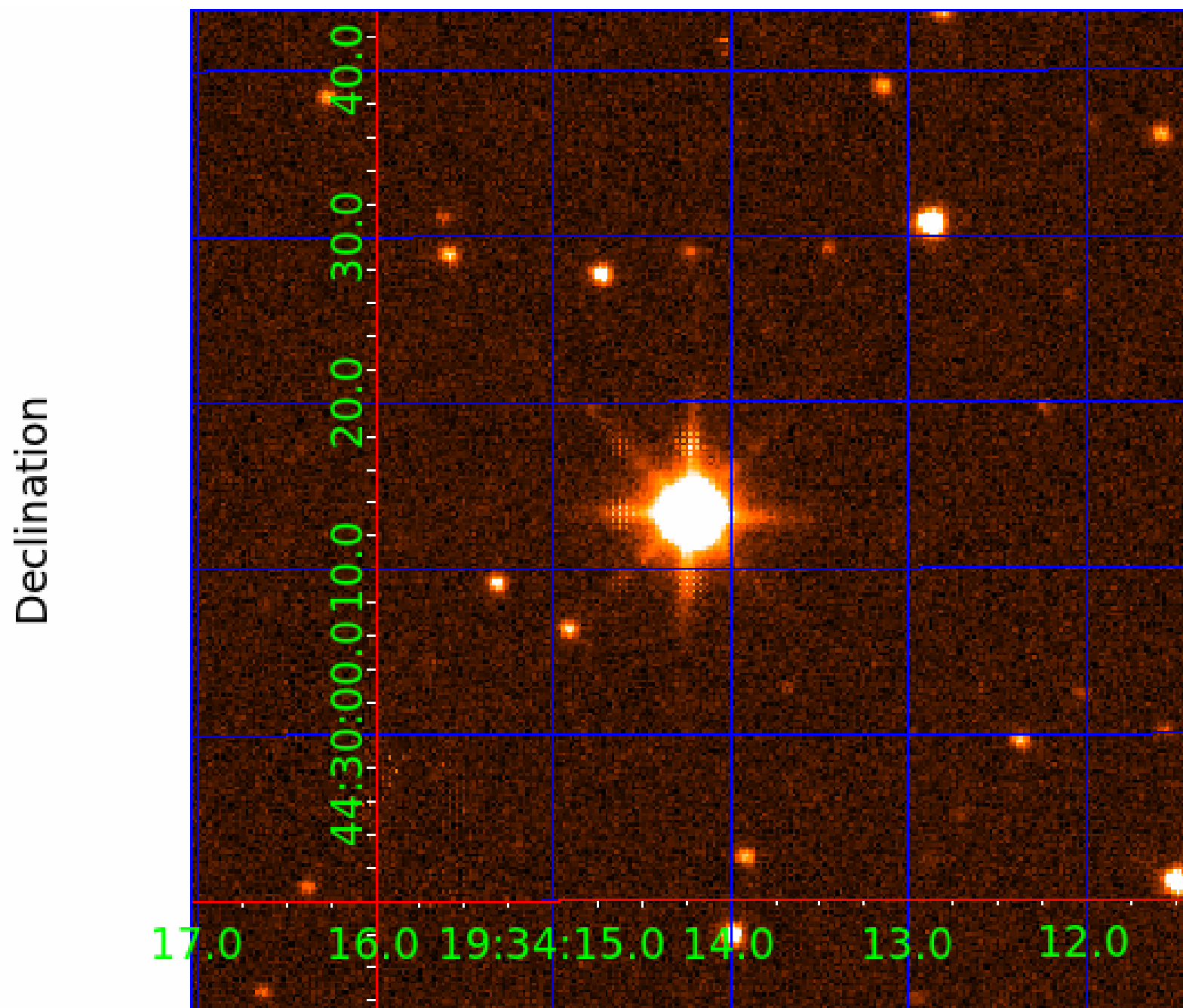
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image



KIC 008499639

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008499639-01 | OBS | No | 2.033062 | 132.059197 | 70.5 | 15.646 | 13.9 | 13.3 | 1.64 | 6794 | 1.62 | 4393.17 |
| 008499639-02 | OBS | No | 12.183893 | 135.460041 | 483.9 | 3.715 | 12.9 | 15.1 | 1.64 | 6794 | 4.09 | 403.58 |
| 008499639-03 | OBS | No | 5.675408 | 132.308997 | 552.9 | 0.997 | 13.4 | 14.7 | 1.64 | 6794 | 3.96 | 1117.68 |
| 008499639-04 | OBS | No | 136.228542 | 137.111846 | 357.9 | 2.194 | 8.3 | 10.1 | 1.64 | 6794 | 3.14 | 16.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008499639-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_SATURATED |
| 008499639-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 008499639-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED |
| 008499639-04 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

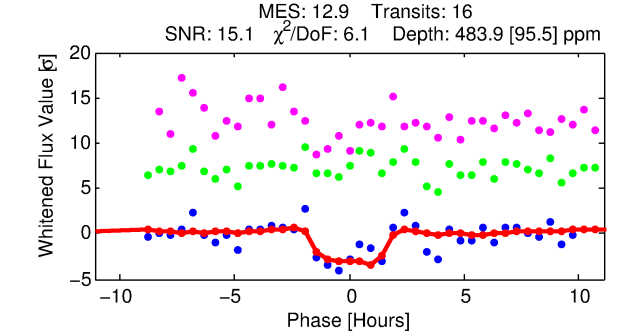
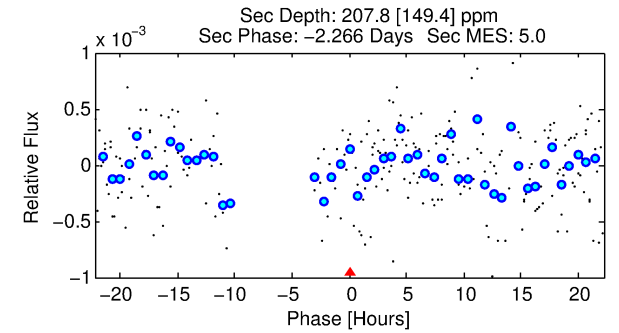
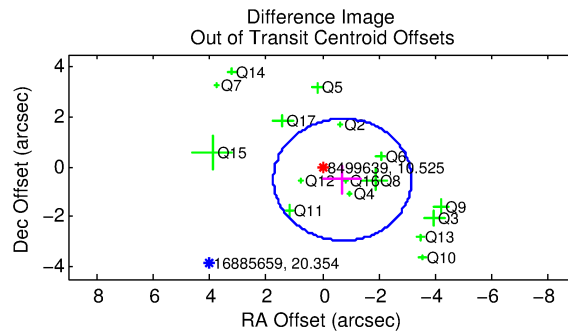
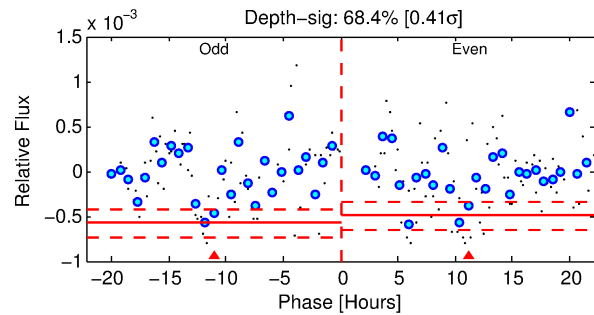
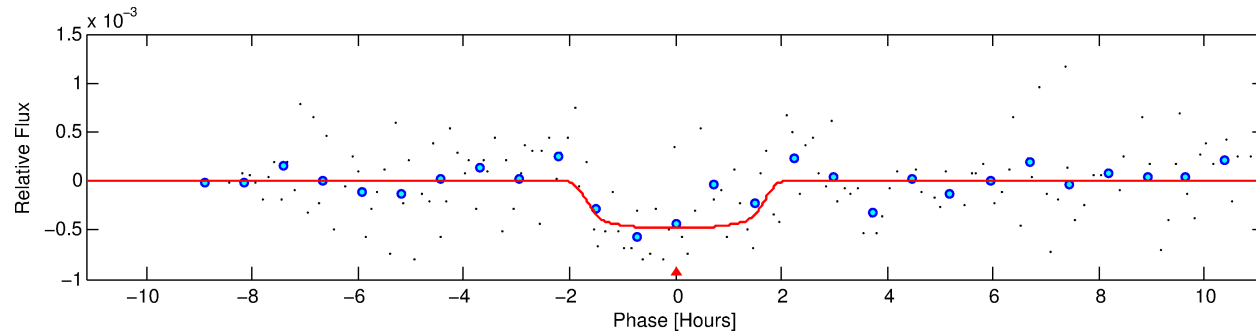
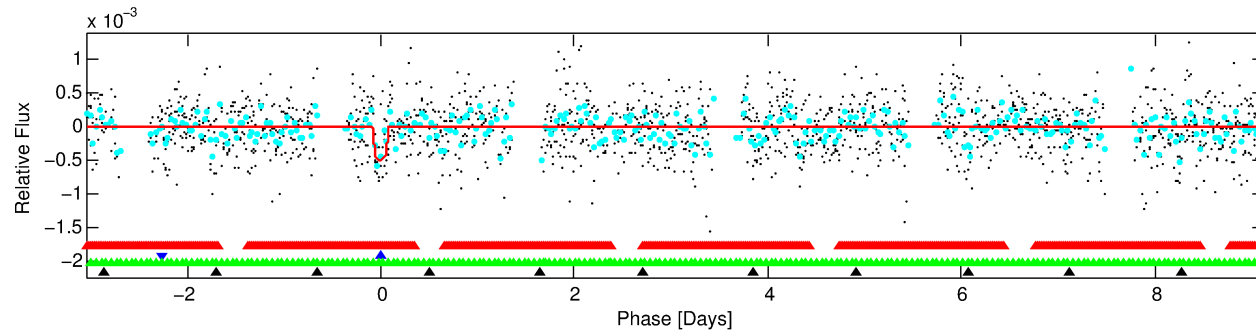
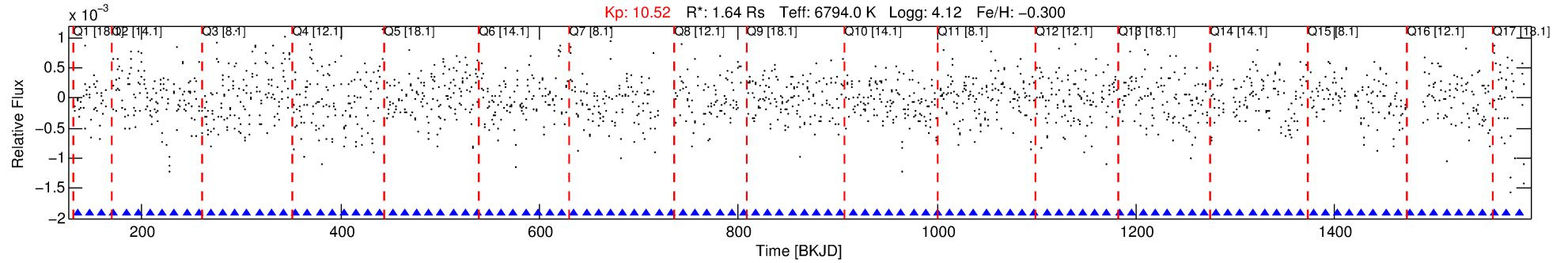
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008499639-02

No Significant Match Found

DV One-Page Summary

KIC: 8499639 Candidate: 2 of 4 Period: 12.184 d



DV Fit Results:

Period = 12.18389 [0.00330] d
Epoch = 135.4600 [0.0815] BKJD
Rp/R* = 0.0229 [0.0127]
a/R* = 13.93 [43.13]
b = 0.86 [0.99]
Seff = 403.58 [152.85]
Teq = 1143 [108] K
Rp = 4.09 [2.58] Re
a = 0.1129 [0.0281] AU
Ag = 86.96 [118.99] [0.72 σ]
Teffp = 5396 [1789] K [2.37 σ]

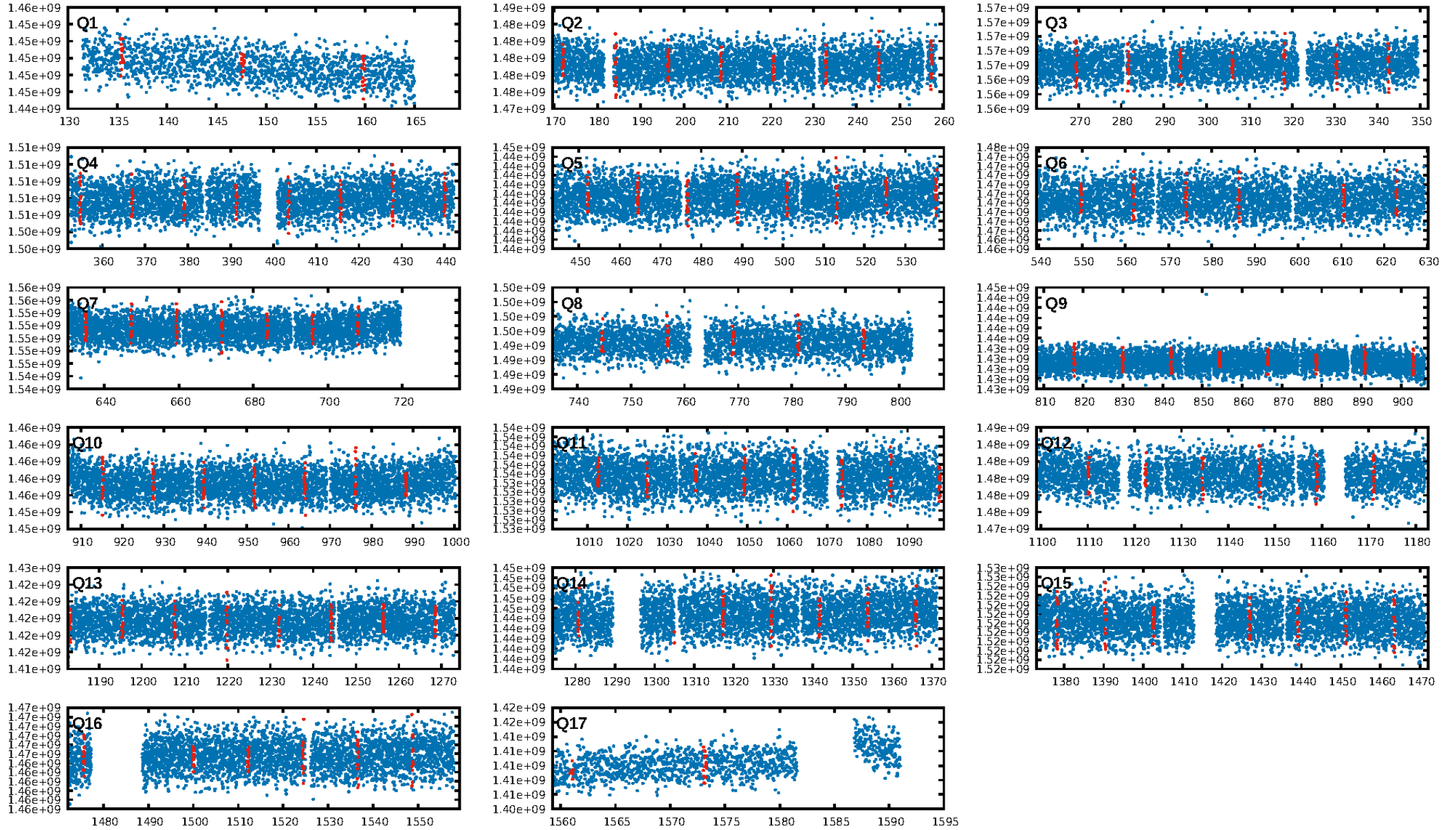
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [40.61 σ]
LongPeriod-sig: 100.0% [690.03 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 9.8%
Bootstrap-pfa: 1.95e-81
RollingBand-fgt: 1.00 [16/16]
GhostDiagnostic-chr: 2.212
Centroid-sig: N/A
Centroid-so: 0.431 arcsec [3.58 σ]
OotOffset-rm: 0.883 arcsec [1.08 σ]
KicOffset-rm: 1.350 arcsec [1.74 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.25 [4/16]
DiffImageOverlap-fno: 0.41 [7/17]

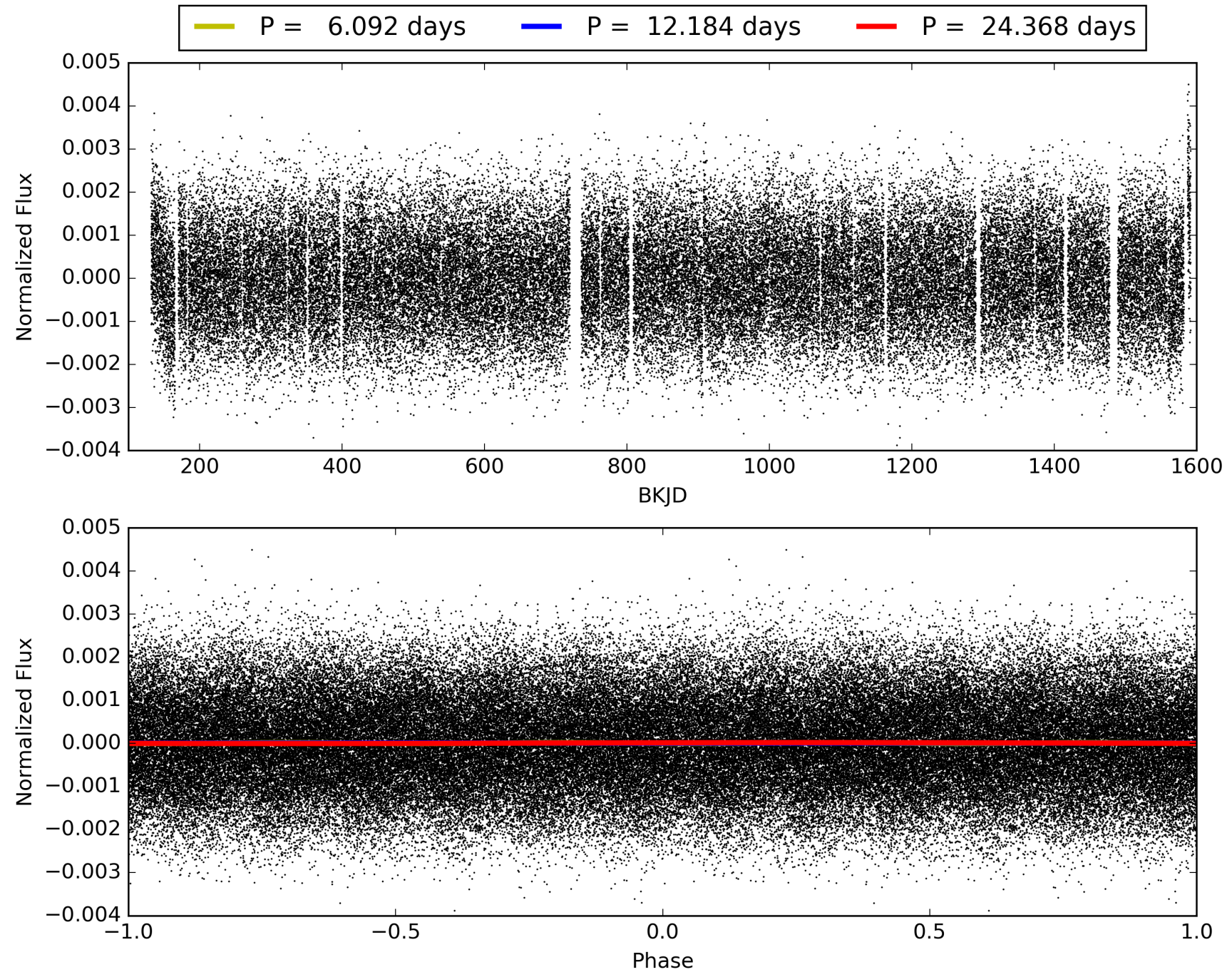
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:49:52 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008499639-02, PDC Light Curves

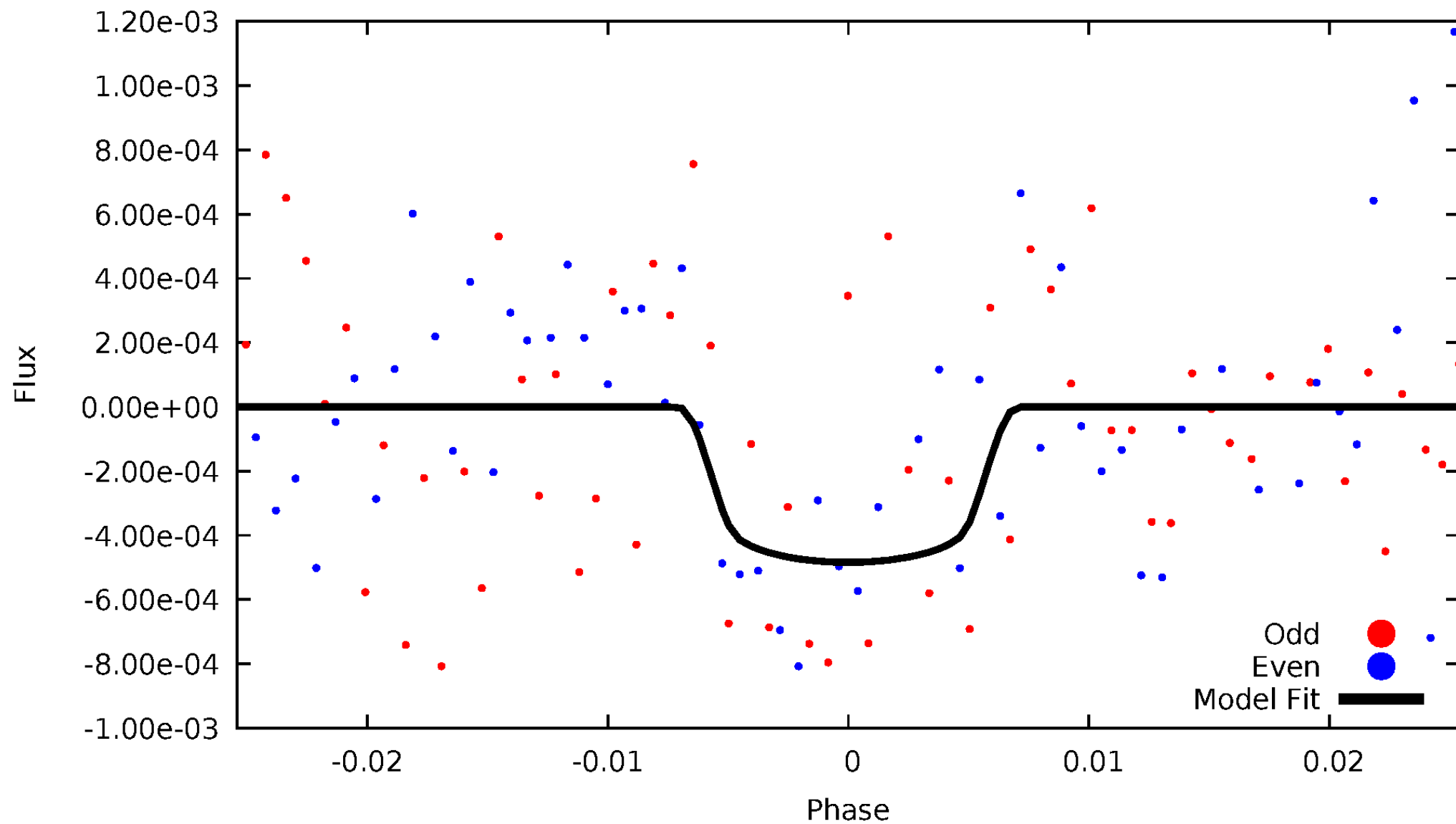


TCE 008499639-02



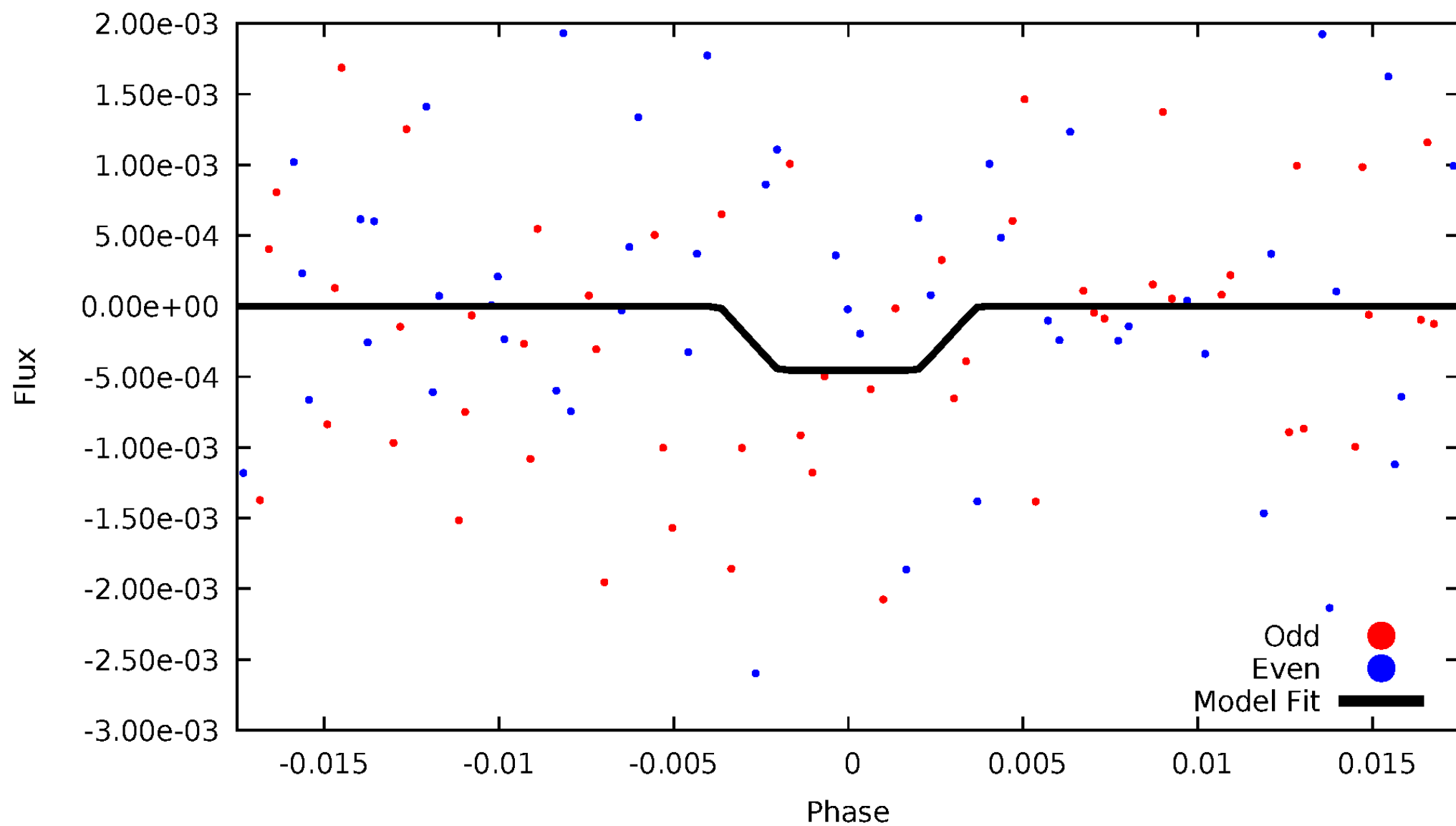
DV Odd/Even

TCE 008499639-02



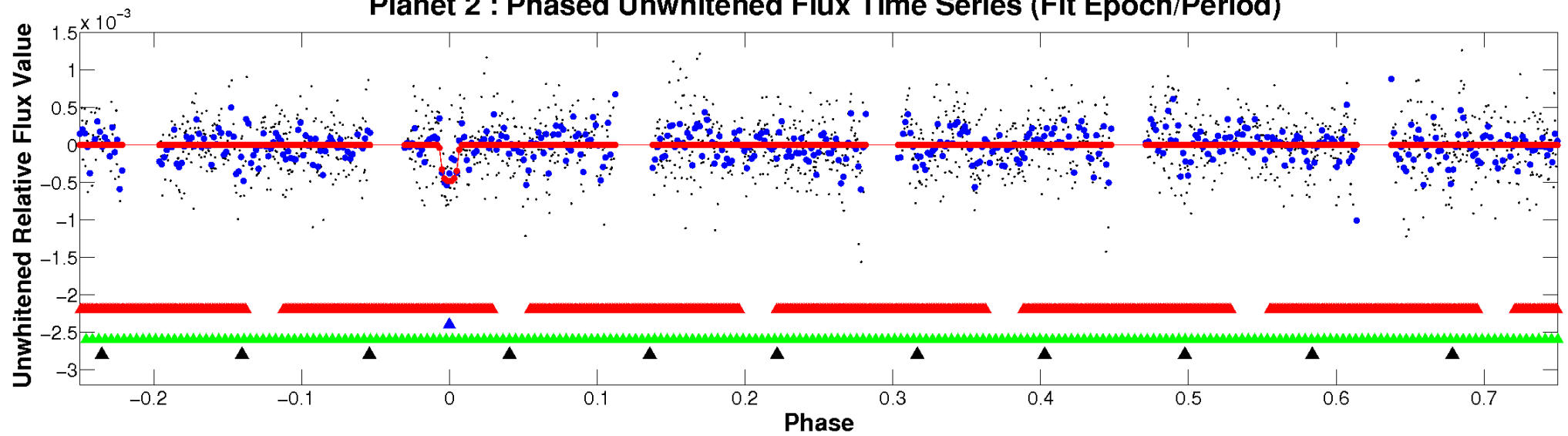
ALT Odd/Even

TCE 008499639-02

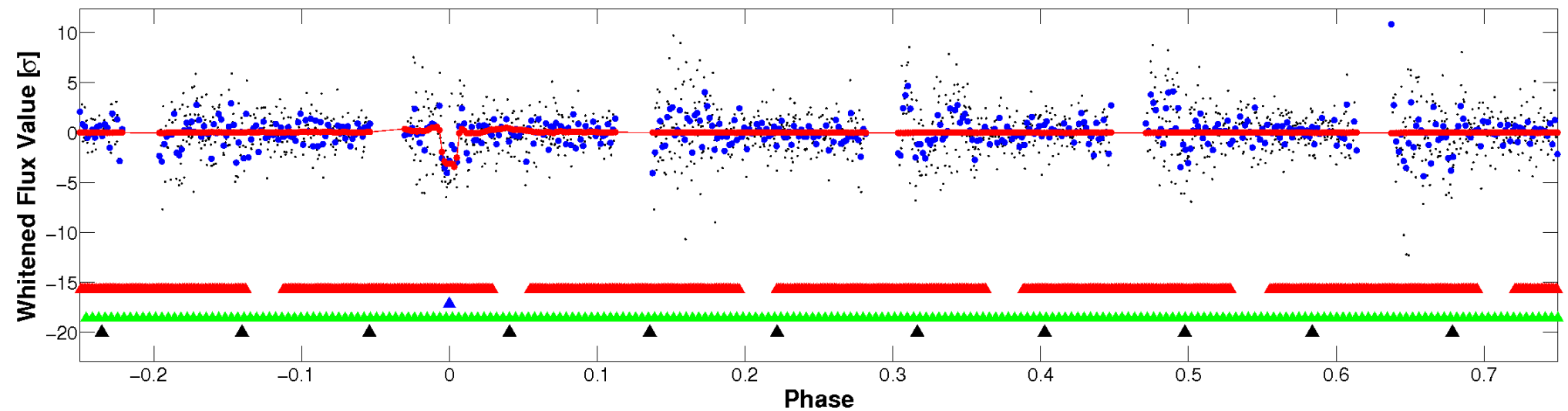


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

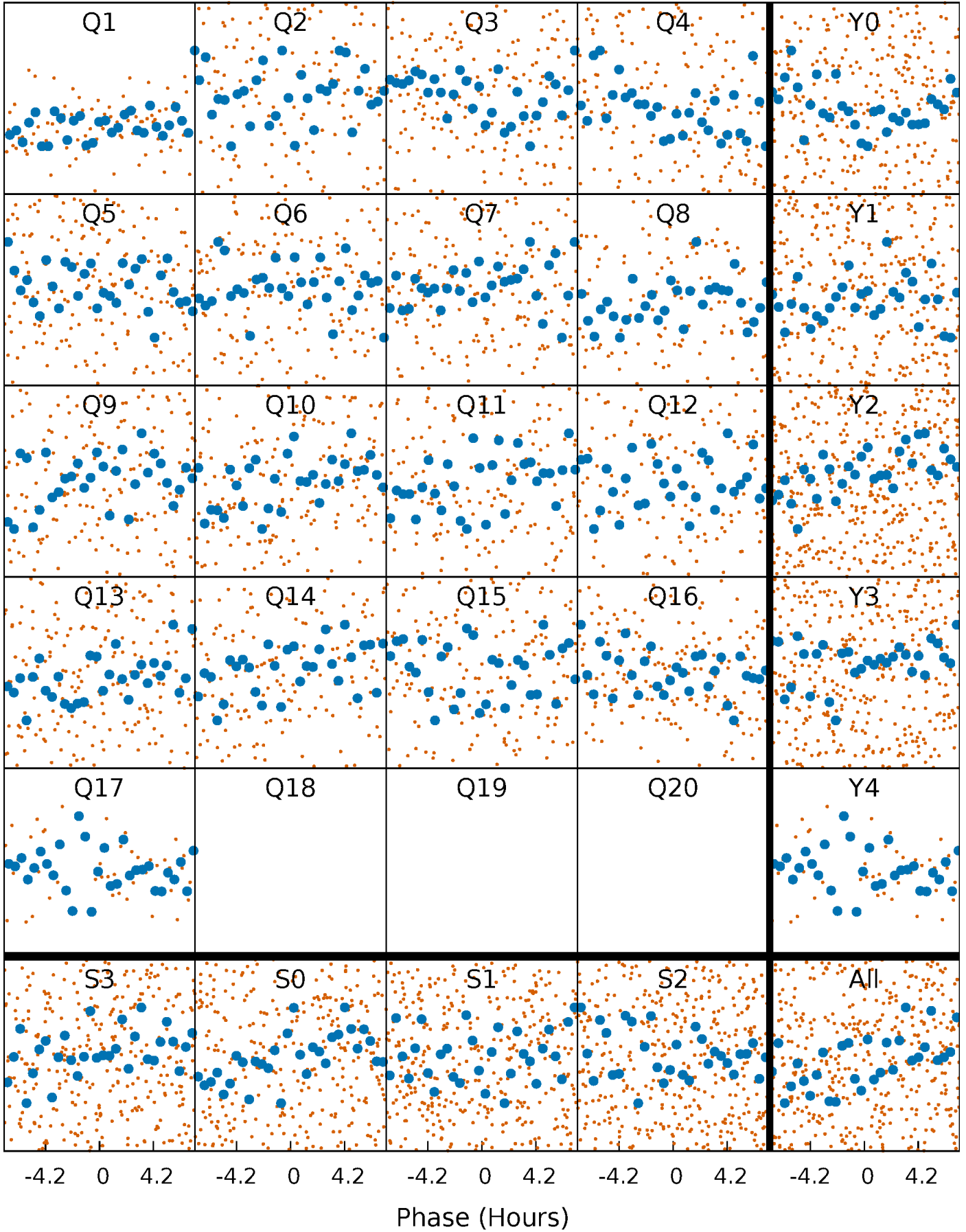


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



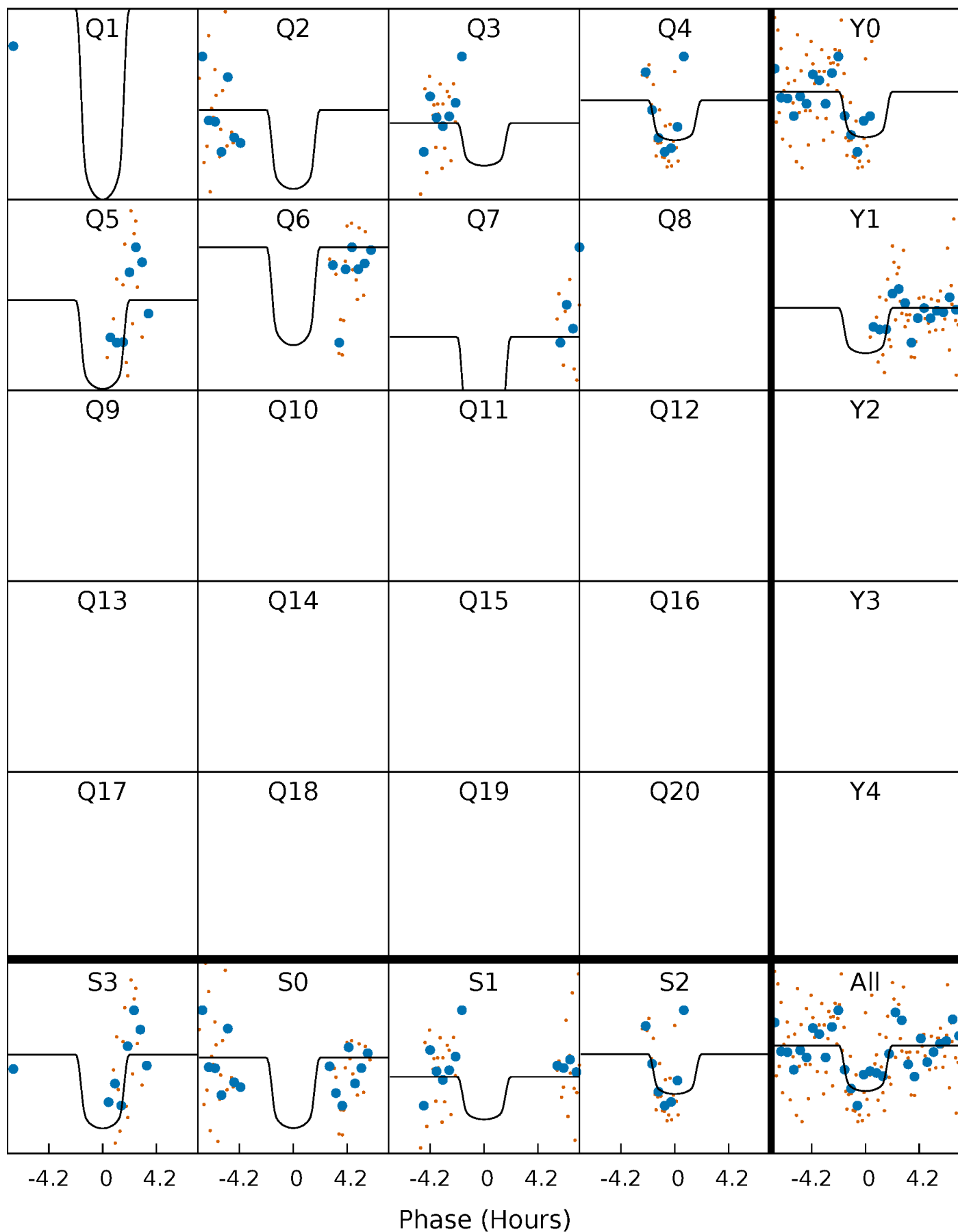
PDC Quarter-Phased Transit Curves

TCE 008499639-02 P= 12.183893 Days $T_0=135.460041$ (BKJD)



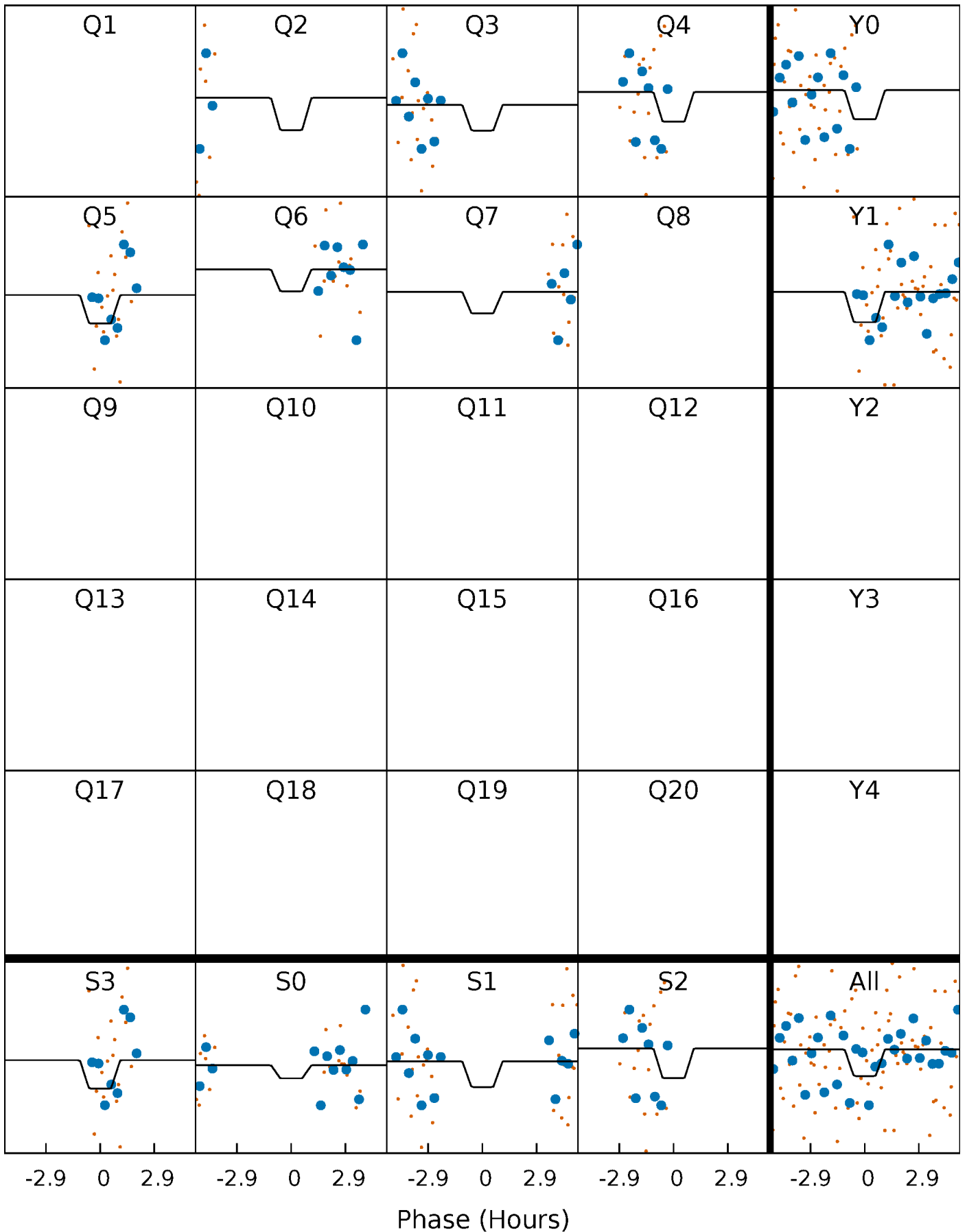
DV Quarter-Phased Transit Curves

TCE 008499639-02 P= 12.183893 Days $T_0=135.460041$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

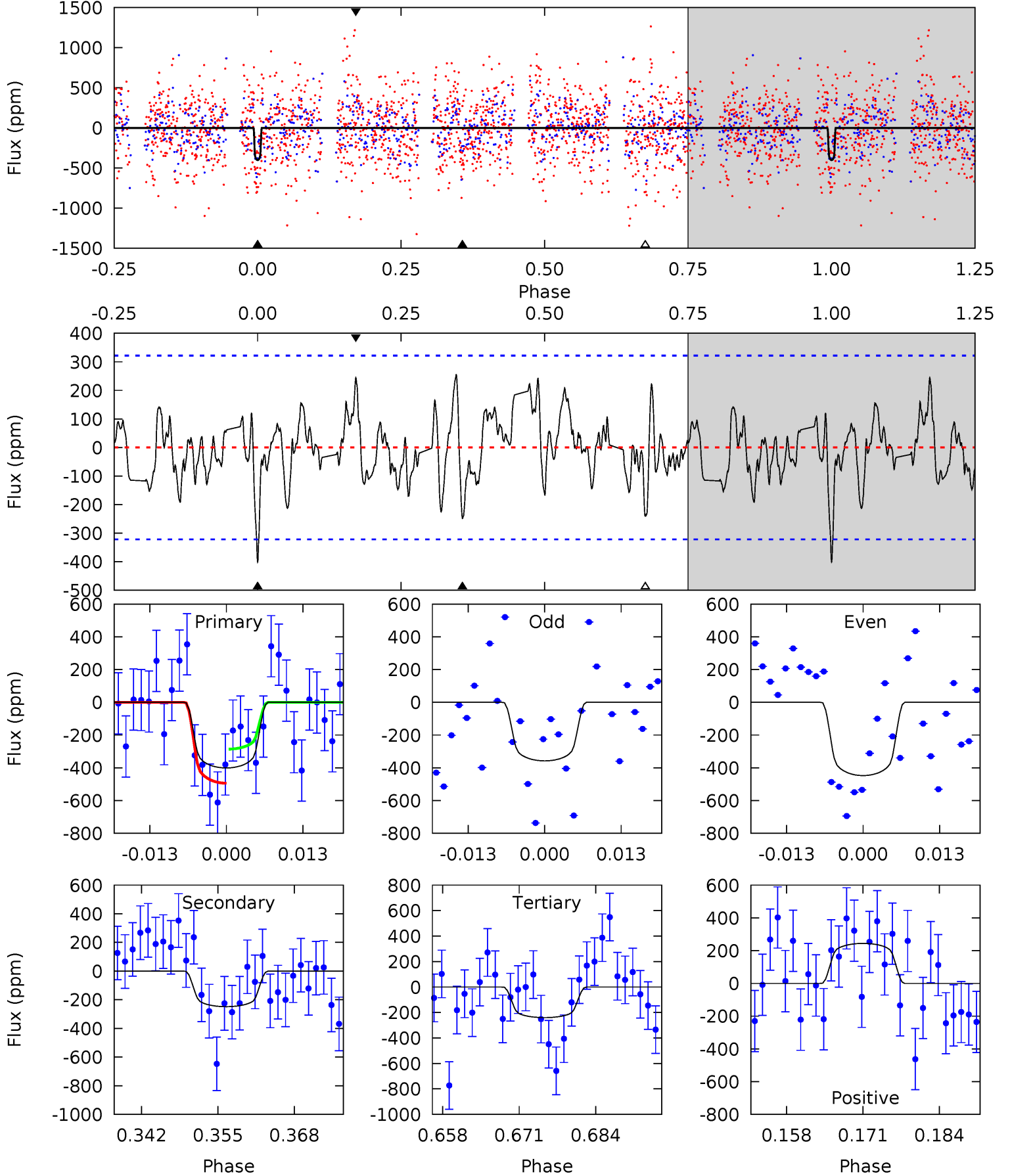
TCE 008499639-02 P= 12.186999 Days $T_0=135.419254$ (BKJD)



DV Model-Shift Uniqueness Test

008499639-02, P = 12.183893 Days, E = 123.276148 Days

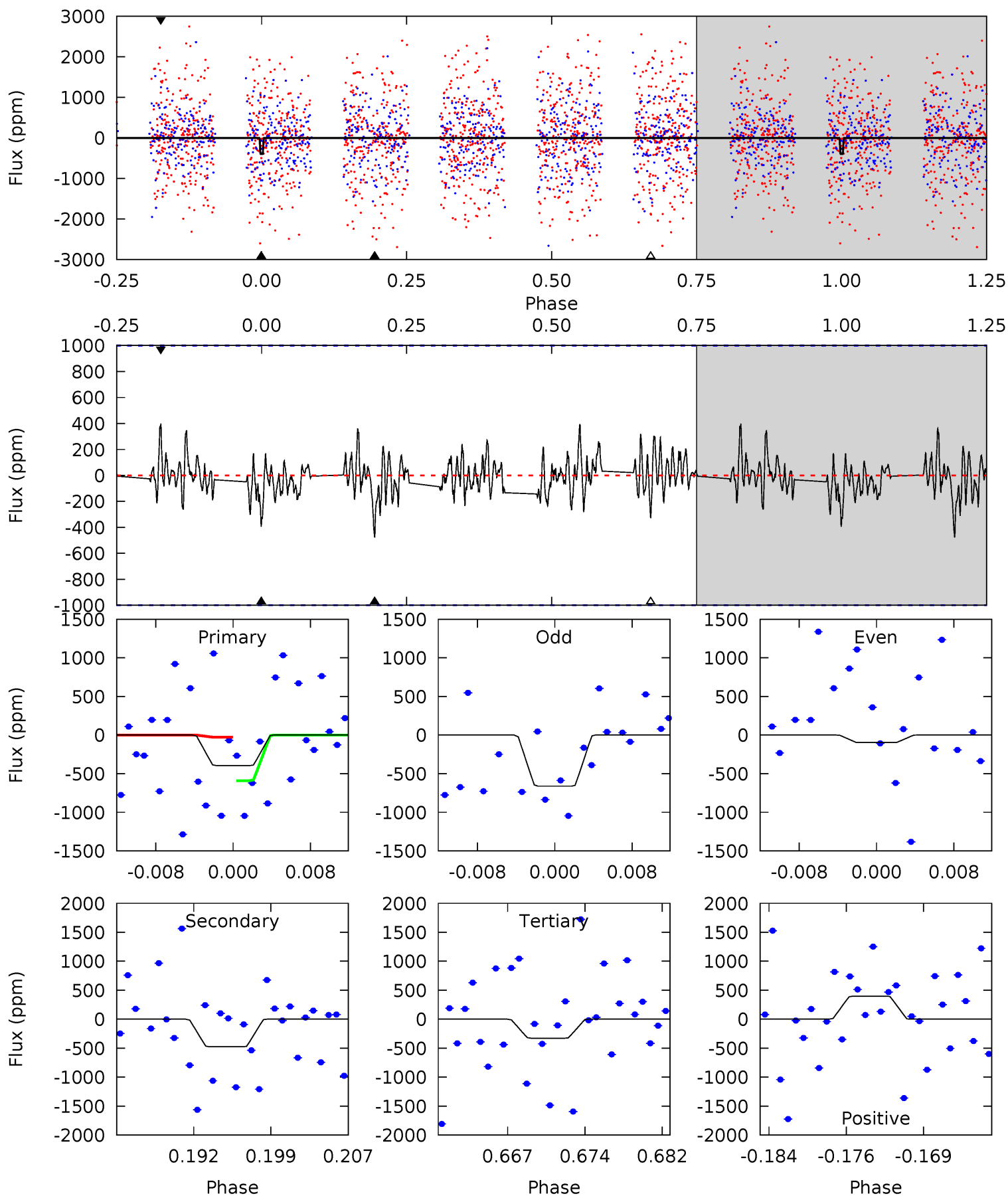
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.20 | 3.84 | 3.72 | 3.78 | 4.97 | 2.48 | 1.46 | 2.49 | 2.43 | 0.12 | 0.06 | 0.69 | 0.63 | 0.39 | 1.60 |



Alt Model-Shift Uniqueness Test

008499639-02, P = 12.186999 Days, E = 123.232255 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2.00 | 2.42 | 1.67 | 2.02 | 5.08 | 2.67 | 0.63 | 0.34 | -0.01 | 0.75 | 0.40 | 1.43 | 0.59 | 0.45 | 1.41 |



Stellar Parameters For KIC 008499639

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6794^{+170}_{-204} | $4.119^{+0.195}_{-0.175}$ | $-0.300^{+0.300}_{-0.300}$ | $1.642^{+0.489}_{-0.444}$ | $1.298^{+0.182}_{-0.223}$ | $0.413^{+0.476}_{-0.189}$ |
| | +3%/-3% | +5%/-4% | +100%/-100% | +30%/-27% | +14%/-17% | +115%/-46% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008499639-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|----------------|------------------------|----------------------|------------------------|---------------------|
| DV | -248 ± 65 | $4.14^{+2.48}_{-2.21}$ | 1589^{+131}_{-106} | 5597^{+2615}_{-1057} | 100^{+367}_{-61} |
| Alt. | -477 ± 197 | $3.75^{+2.43}_{-1.94}$ | 1592^{+122}_{-120} | 6792^{+4313}_{-1631} | 223^{+814}_{-151} |

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

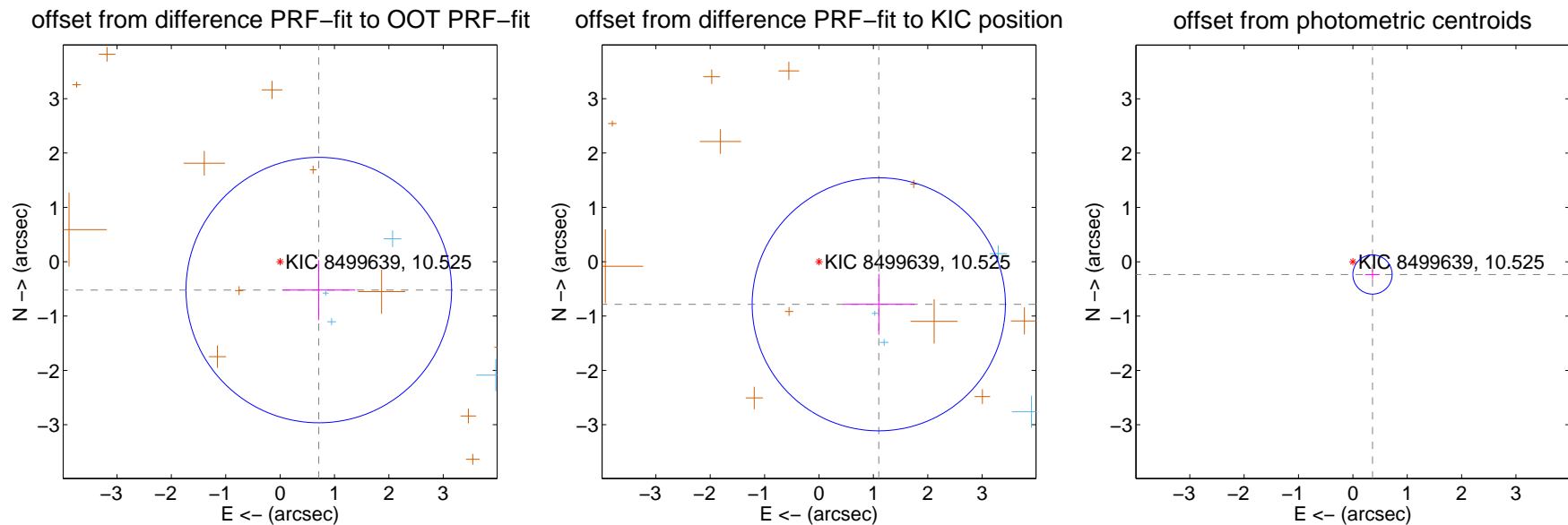
DV Centroid Data

Supplemental centroid analysis for 008499639-02. **Kepler magnitude: 10.53**. Transit SNR 15.09

There are 4 quarters with good PRF difference image offsets

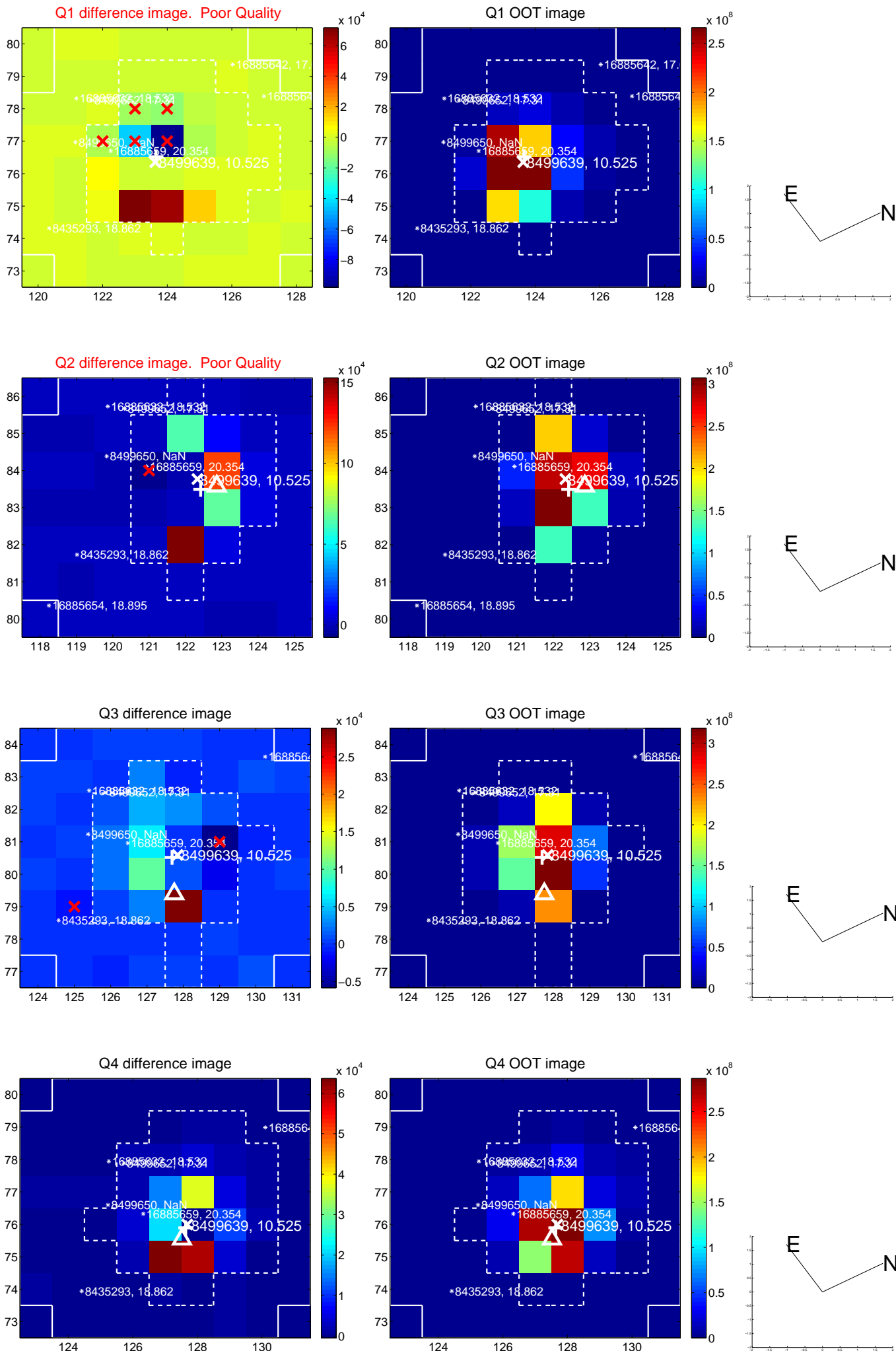
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-----------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.883 ± 0.814 | 1.08 | -0.712 ± 0.672 | -0.522 ± 0.552 |
| PRF-fit source offset from KIC position | 1.350 ± 0.776 | 1.74 | -1.099 ± 0.658 | -0.784 ± 0.560 |
| photometric centroid source offset | 0.43 ± 0.12 | 3.58 | -0.36 ± 0.13 | -0.23 ± 0.08 |

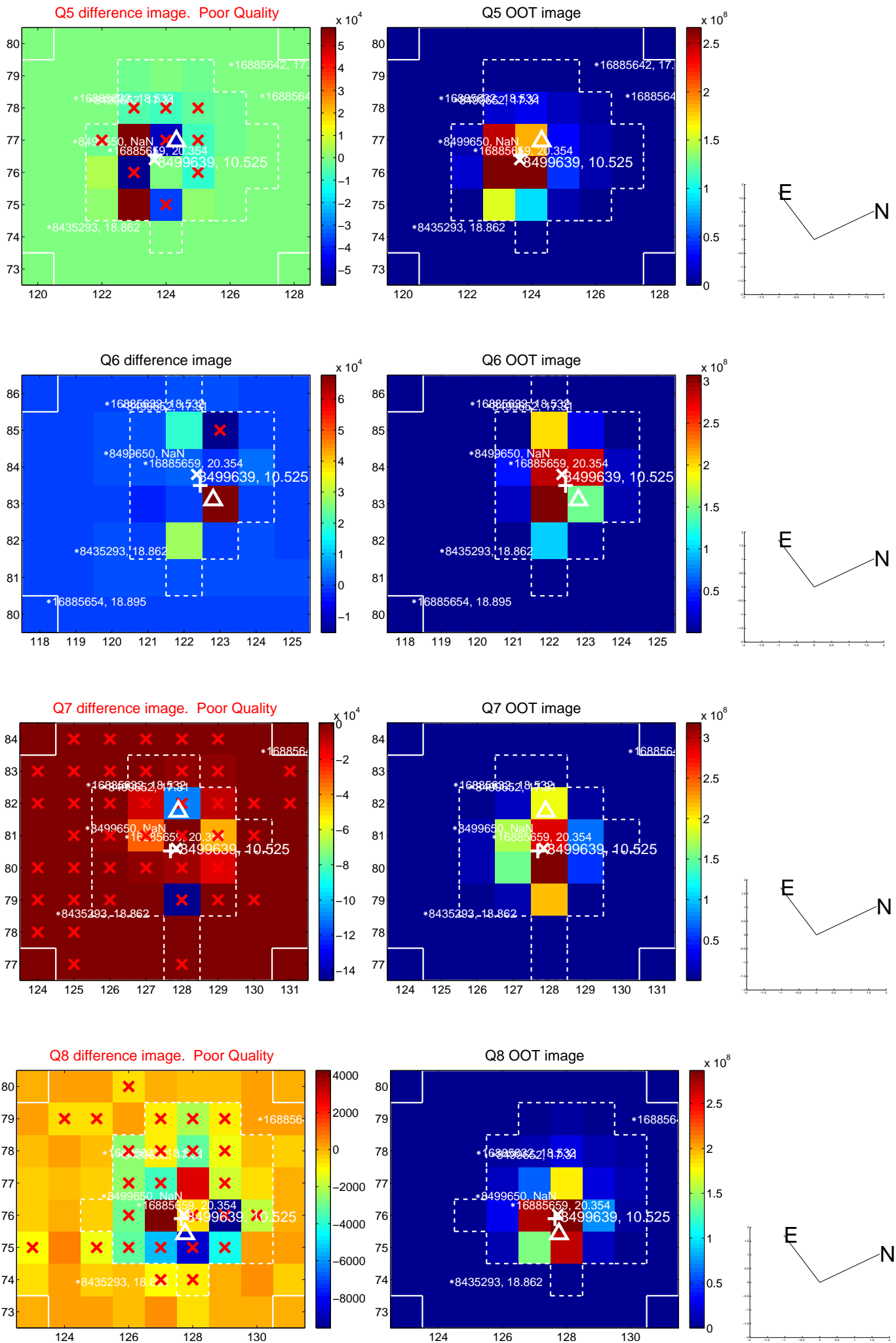


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

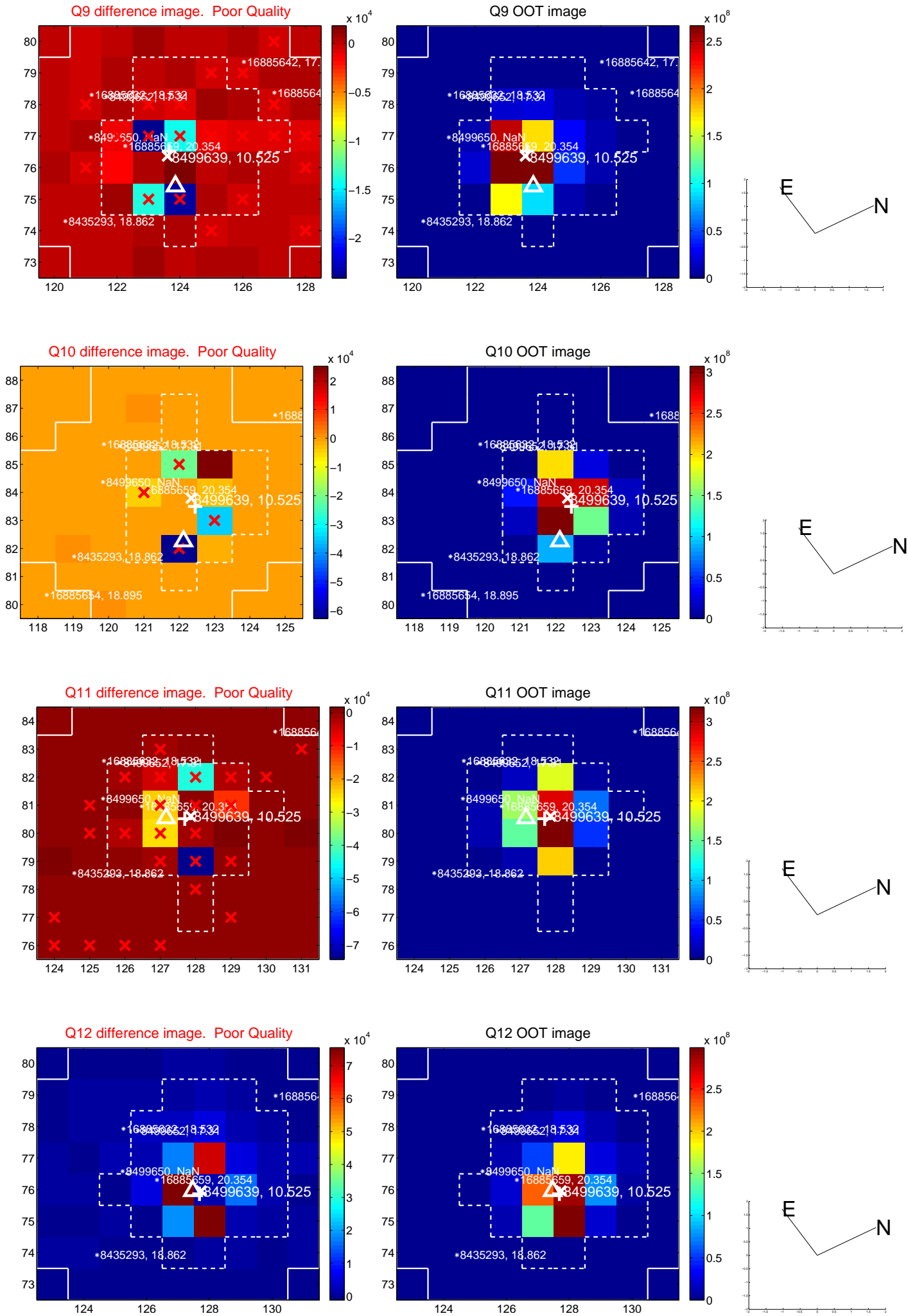
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



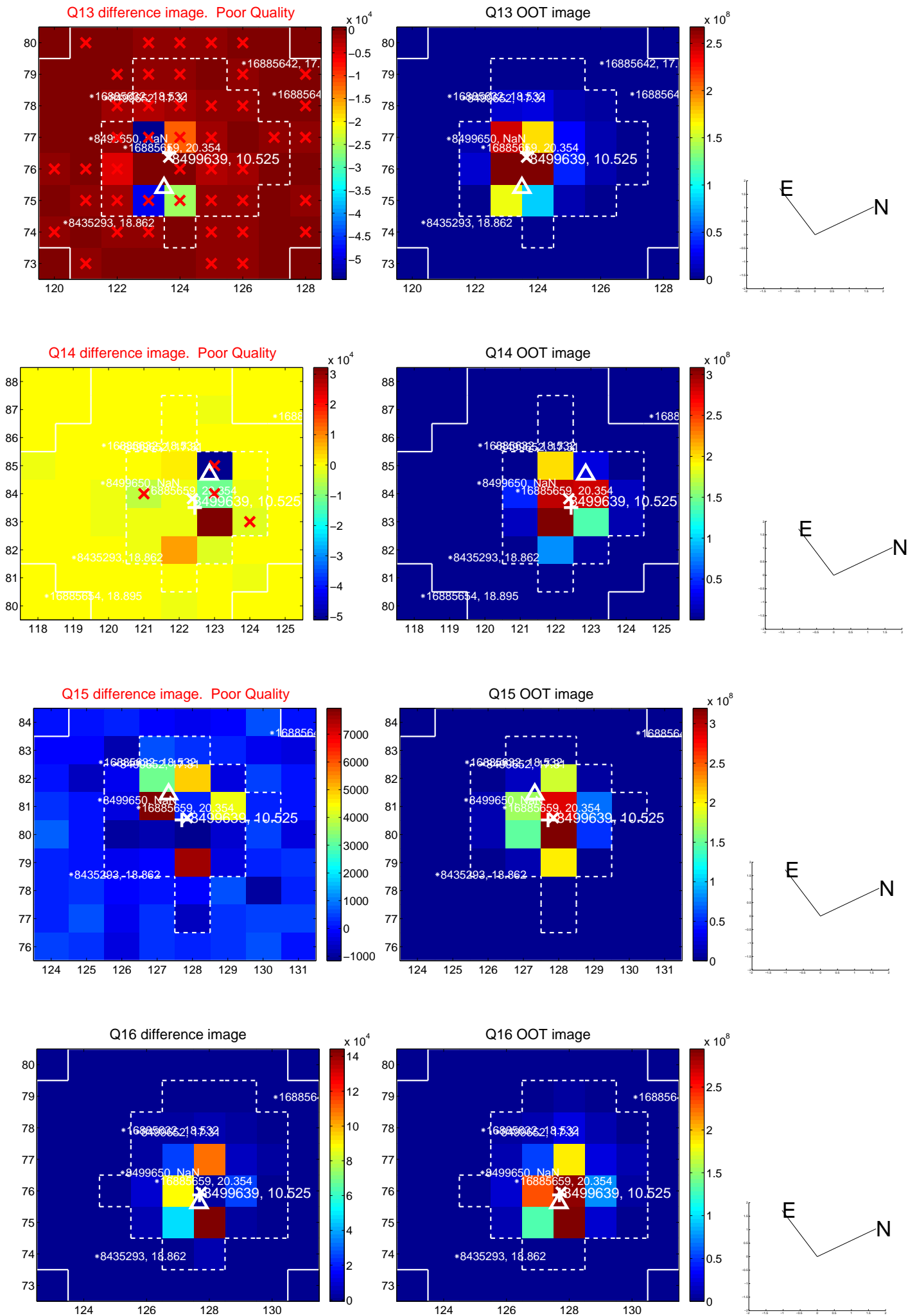
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



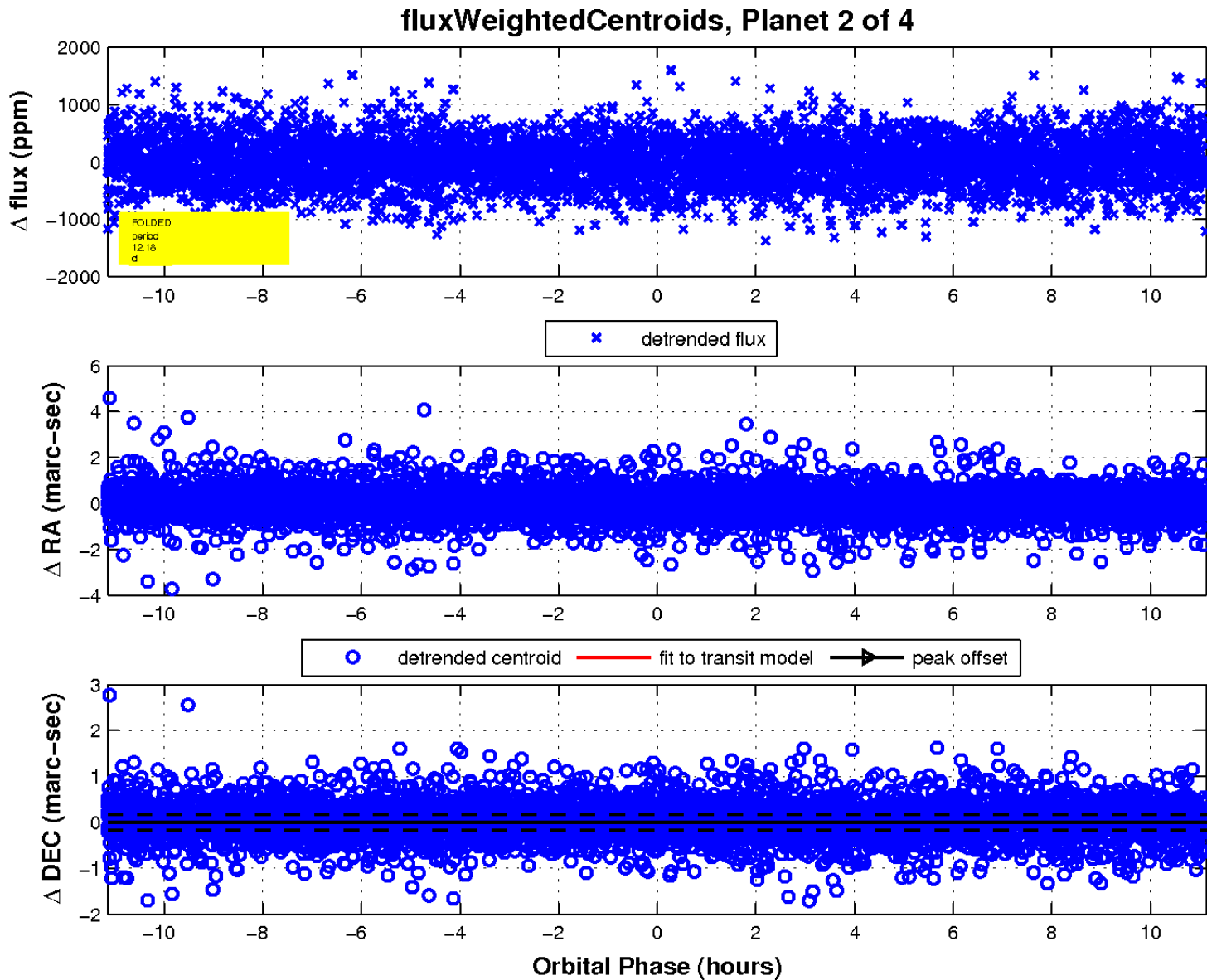
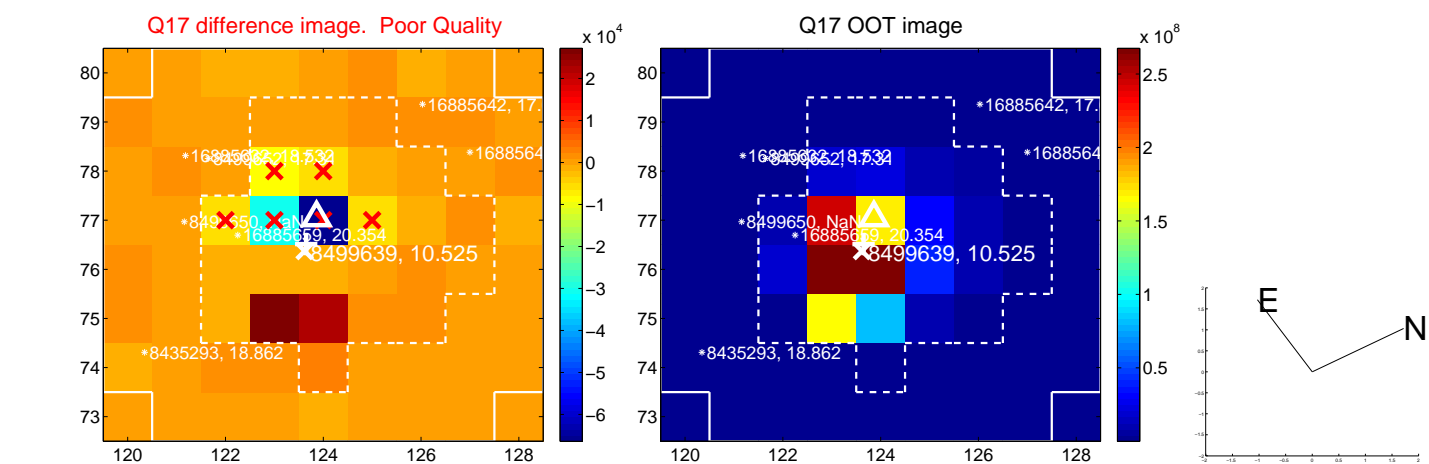
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



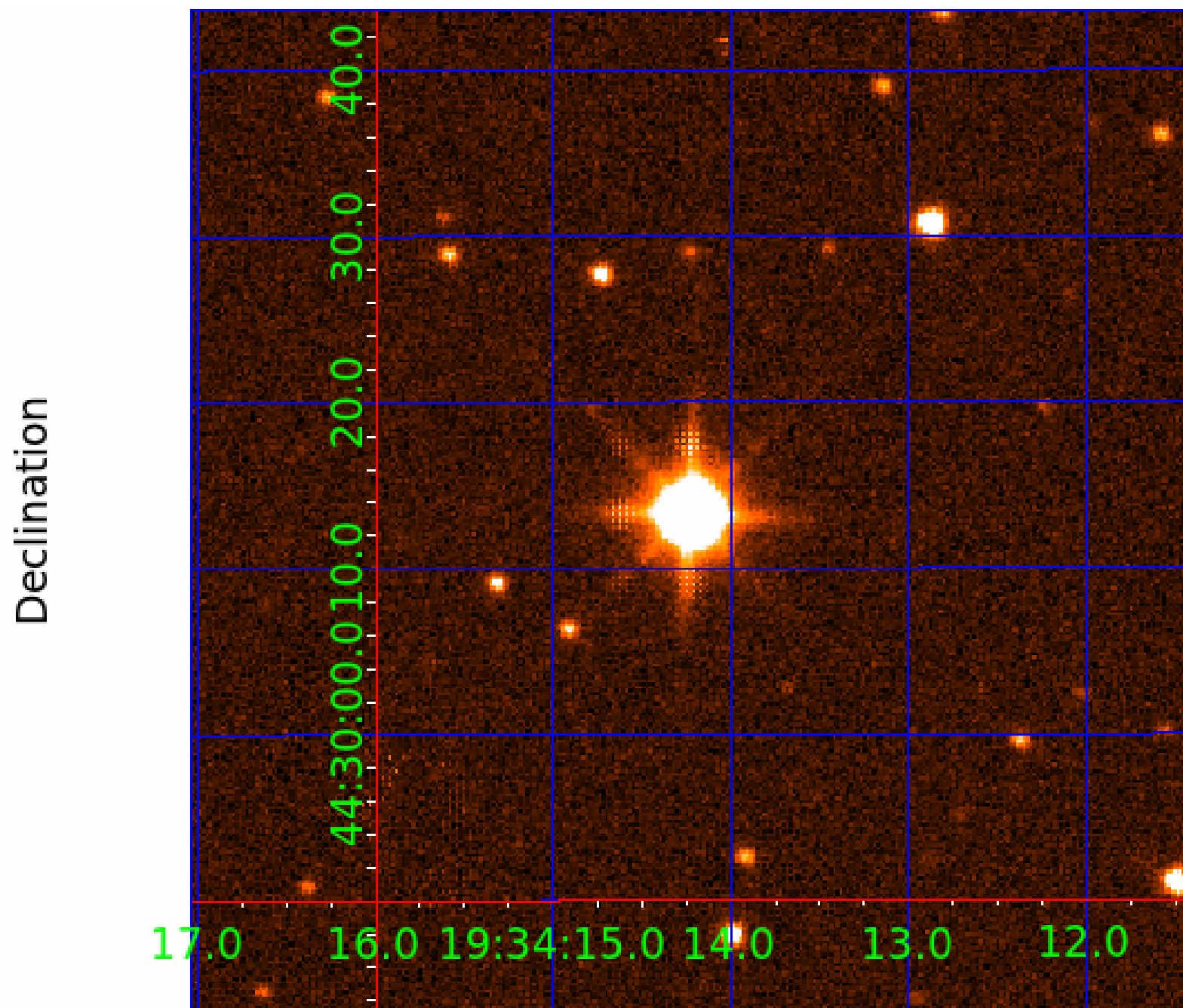
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image



KIC 008499639

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008499639-01 | OBS | No | 2.033062 | 132.059197 | 70.5 | 15.646 | 13.9 | 13.3 | 1.64 | 6794 | 1.62 | 4393.17 |
| 008499639-02 | OBS | No | 12.183893 | 135.460041 | 483.9 | 3.715 | 12.9 | 15.1 | 1.64 | 6794 | 4.09 | 403.58 |
| 008499639-03 | OBS | No | 5.675408 | 132.308997 | 552.9 | 0.997 | 13.4 | 14.7 | 1.64 | 6794 | 3.96 | 1117.68 |
| 008499639-04 | OBS | No | 136.228542 | 137.111846 | 357.9 | 2.194 | 8.3 | 10.1 | 1.64 | 6794 | 3.14 | 16.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008499639-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_SATURATED |
| 008499639-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 008499639-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED |
| 008499639-04 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

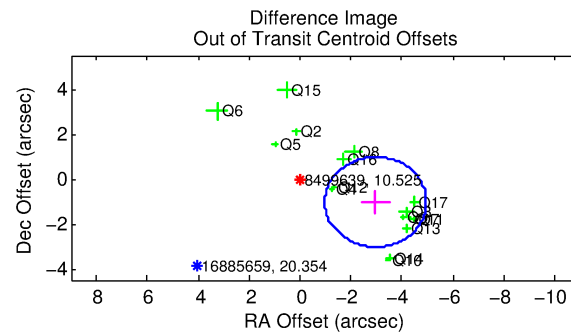
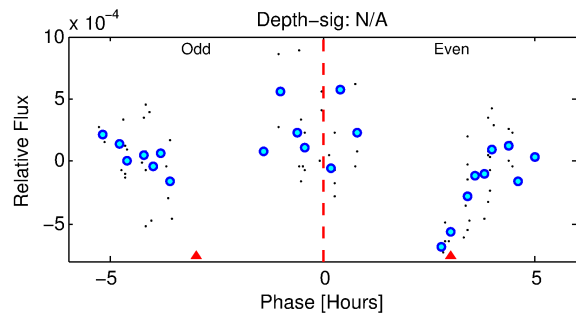
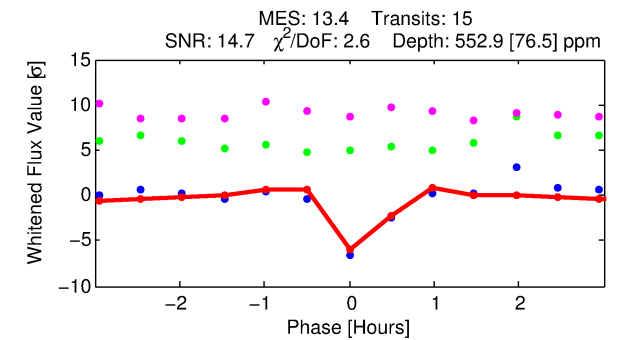
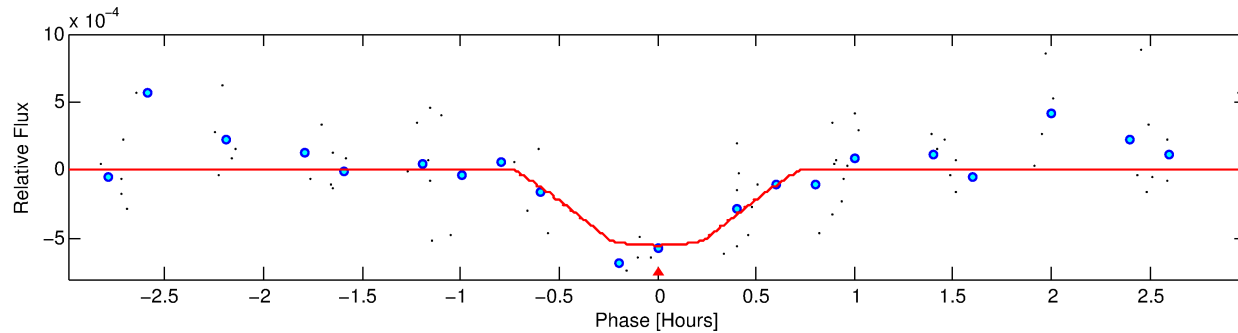
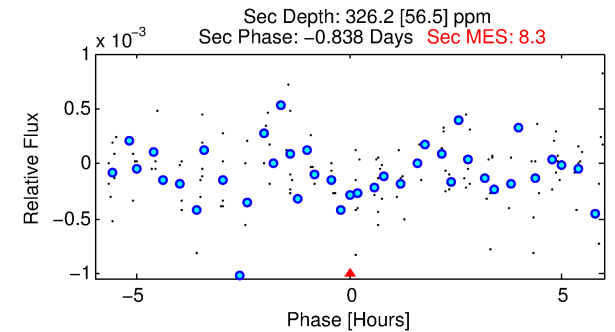
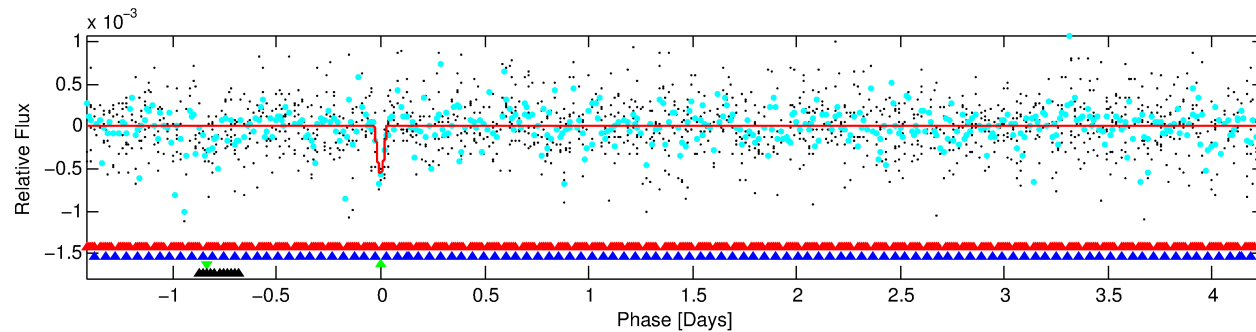
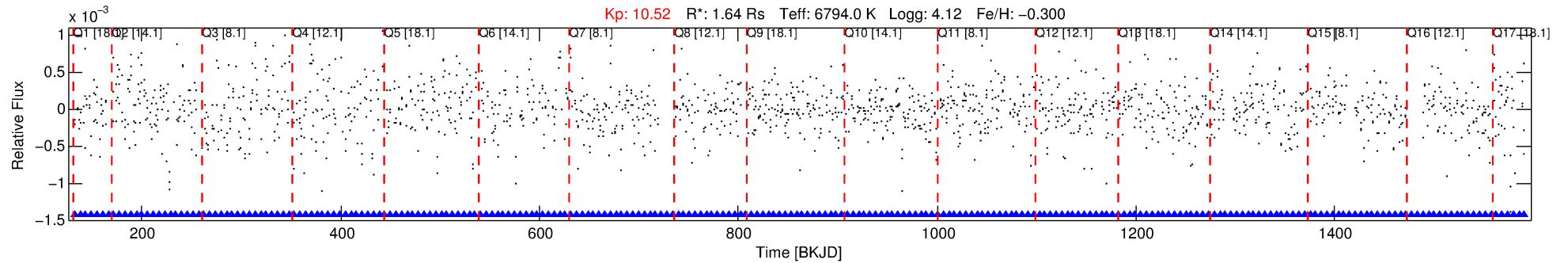
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008499639-03

No Significant Match Found

DV One-Page Summary

KIC: 8499639 Candidate: 3 of 4 Period: 5.675 d



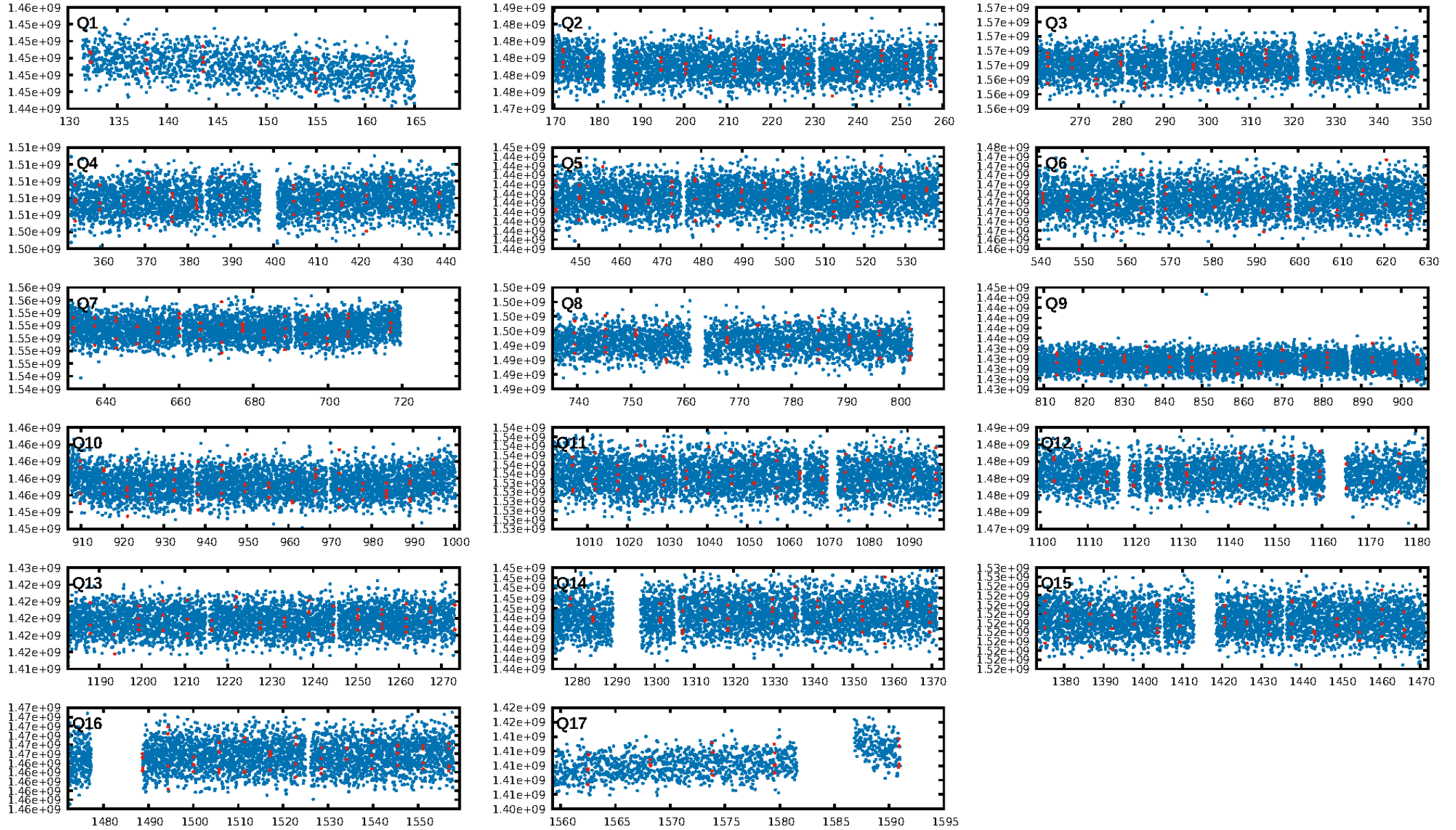
DV Fit Results:

Period = 5.67541 [0.00003] d
Epoch = 132.3090 [0.0030] BKJD
Rp/R* = 0.0221 [0.0184]
a/R* = 42.69 [196.75]
b = 0.28 [14.93]
Seff = 1117.68 [423.31]
Teq = 1474 [140] K
Rp = 3.96 [3.49] Re
a = 0.0679 [0.0169] AU
Ag = 52.80 [90.27] [0.57] σ
Teffp = 6145 [2574] K [1.81] σ

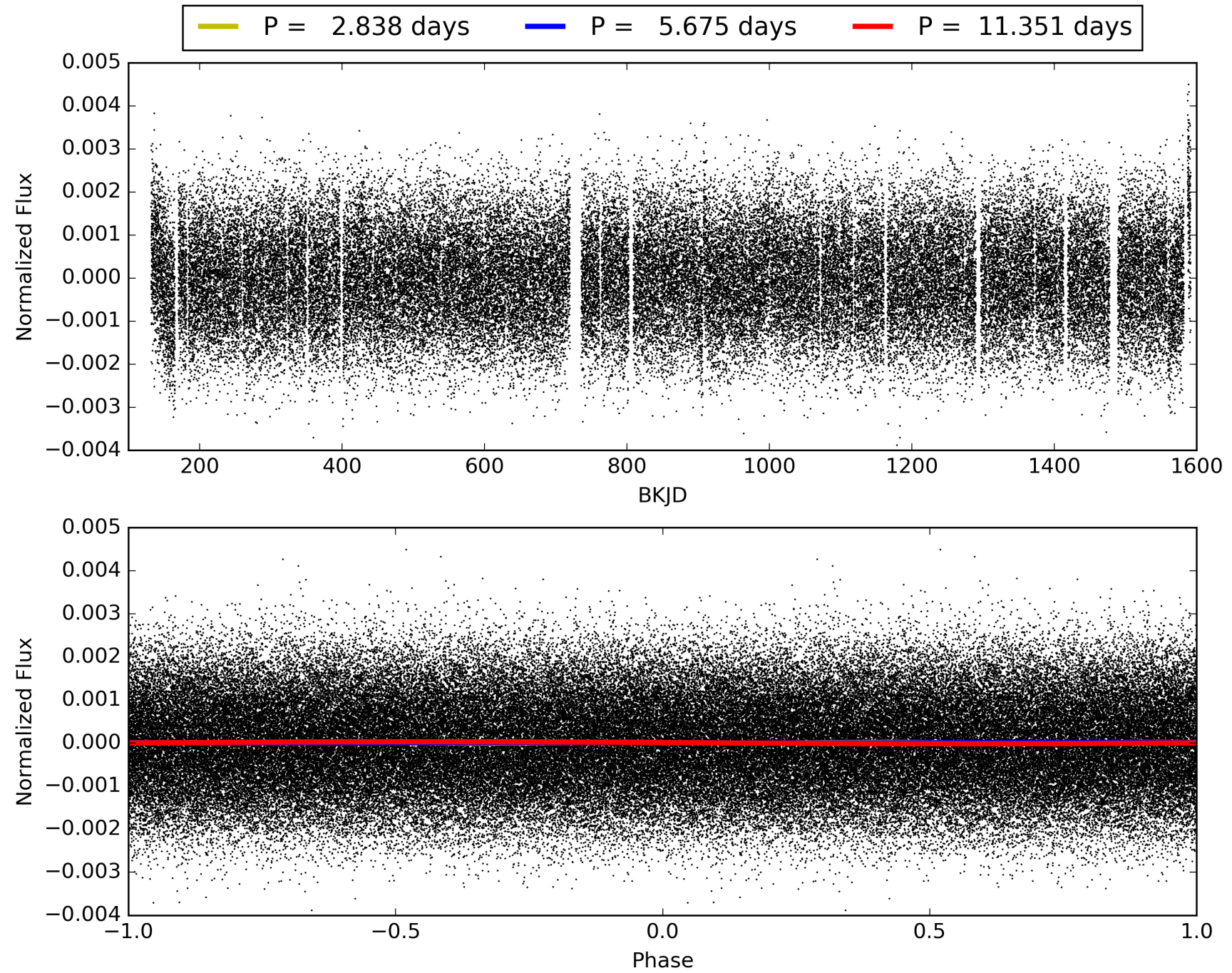
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.58] σ
LongPeriod-sig: 100.0% [40.61] σ
ModelChiSquare2-sig: 16.5%
ModelChiSquareGof-sig: 98.5%
Bootstrap-pfa: 5.25e-30
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: -0.2514
Centroid-sig: N/A
Centroid-so: 0.257 arcsec [2.67] σ
OotOffset-rm: 3.143 arcsec [4.71] σ
KicOffset-rm: 3.339 arcsec [5.53] σ
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.29 [5/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 008499639-03, PDC Light Curves

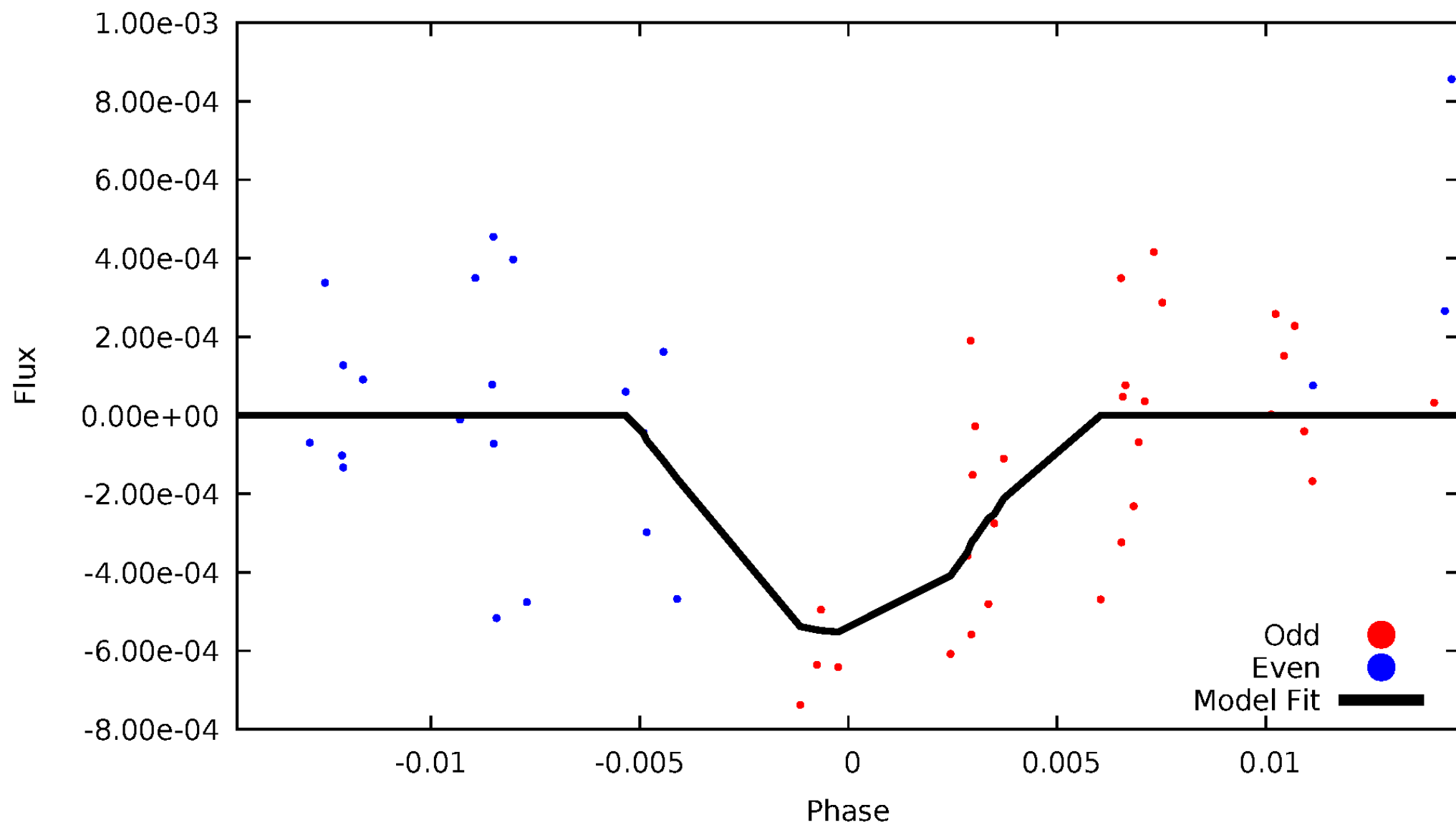


TCE 008499639-03



DV Odd/Even

TCE 008499639-03

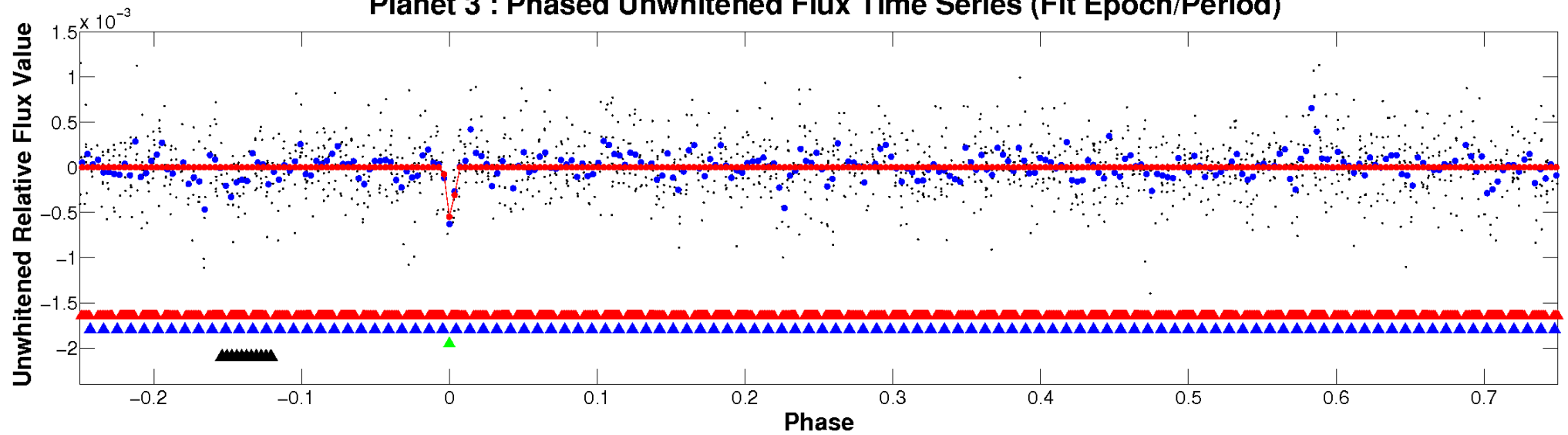


ALT Odd/Even

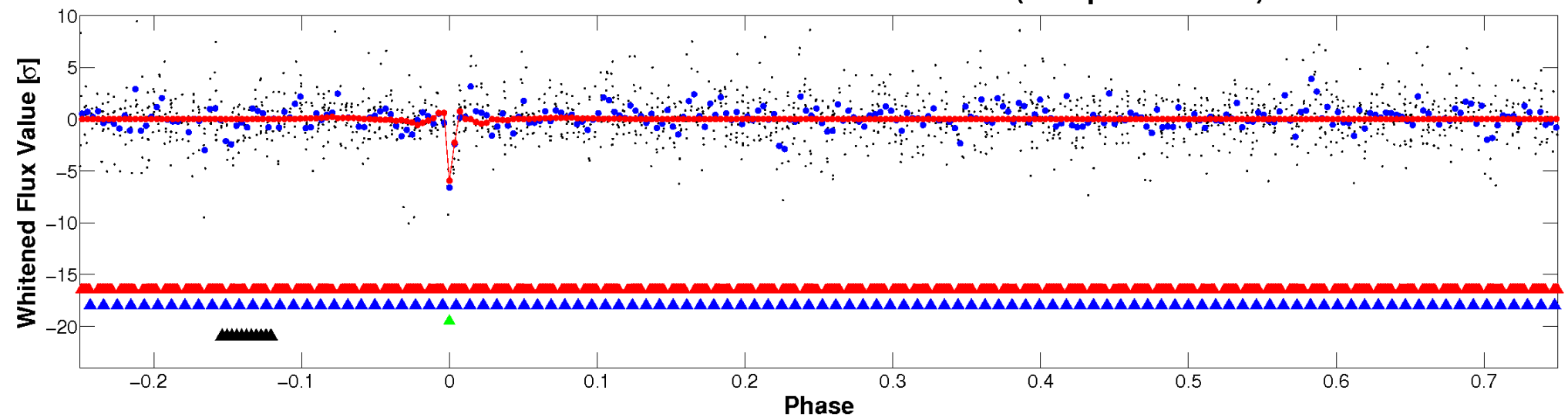
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

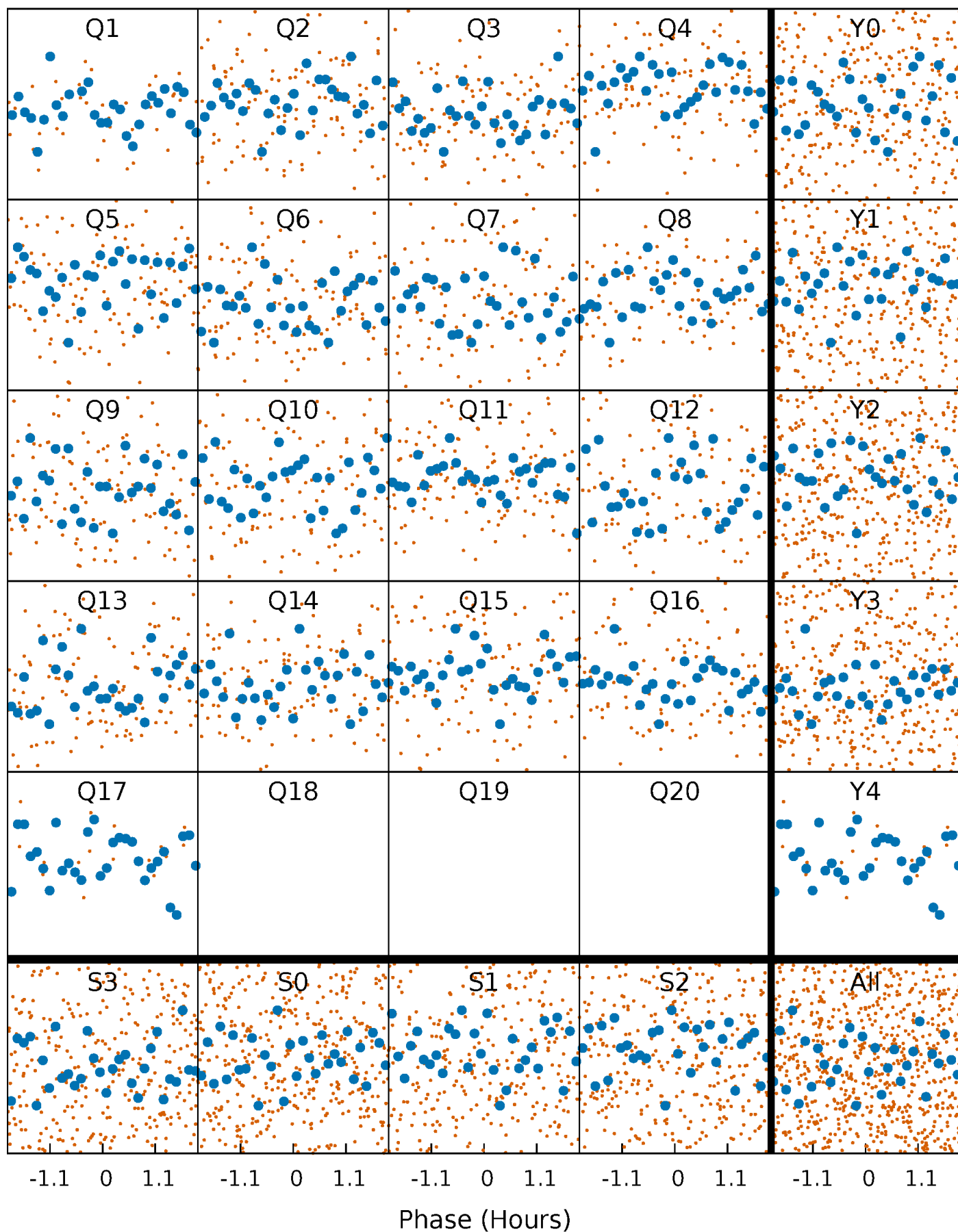


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



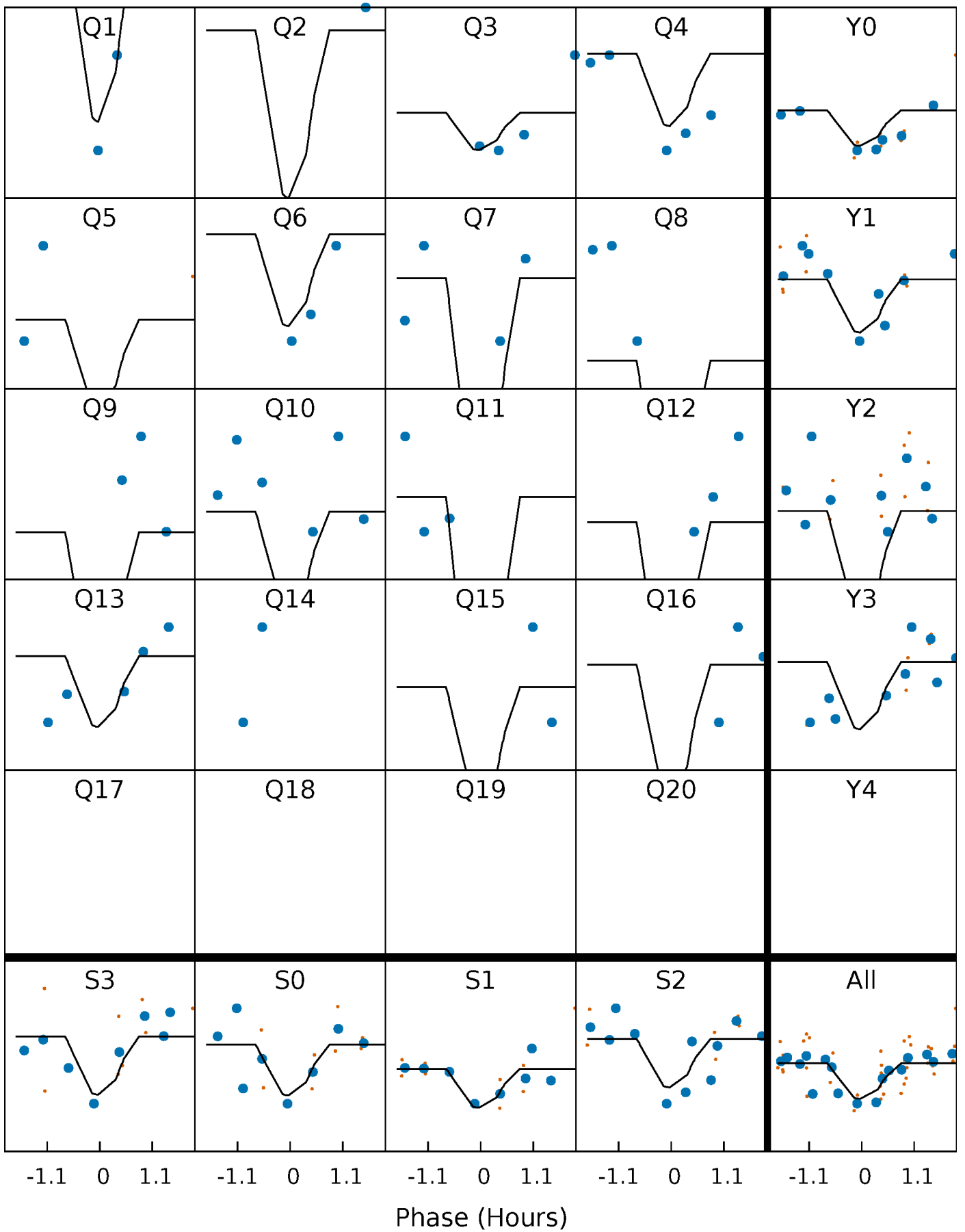
PDC Quarter-Phased Transit Curves

TCE 008499639-03 P= 5.675408 Days $T_0=132.308997$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 008499639-03 P= 5.675408 Days $T_0=132.308997$ (BKJD)

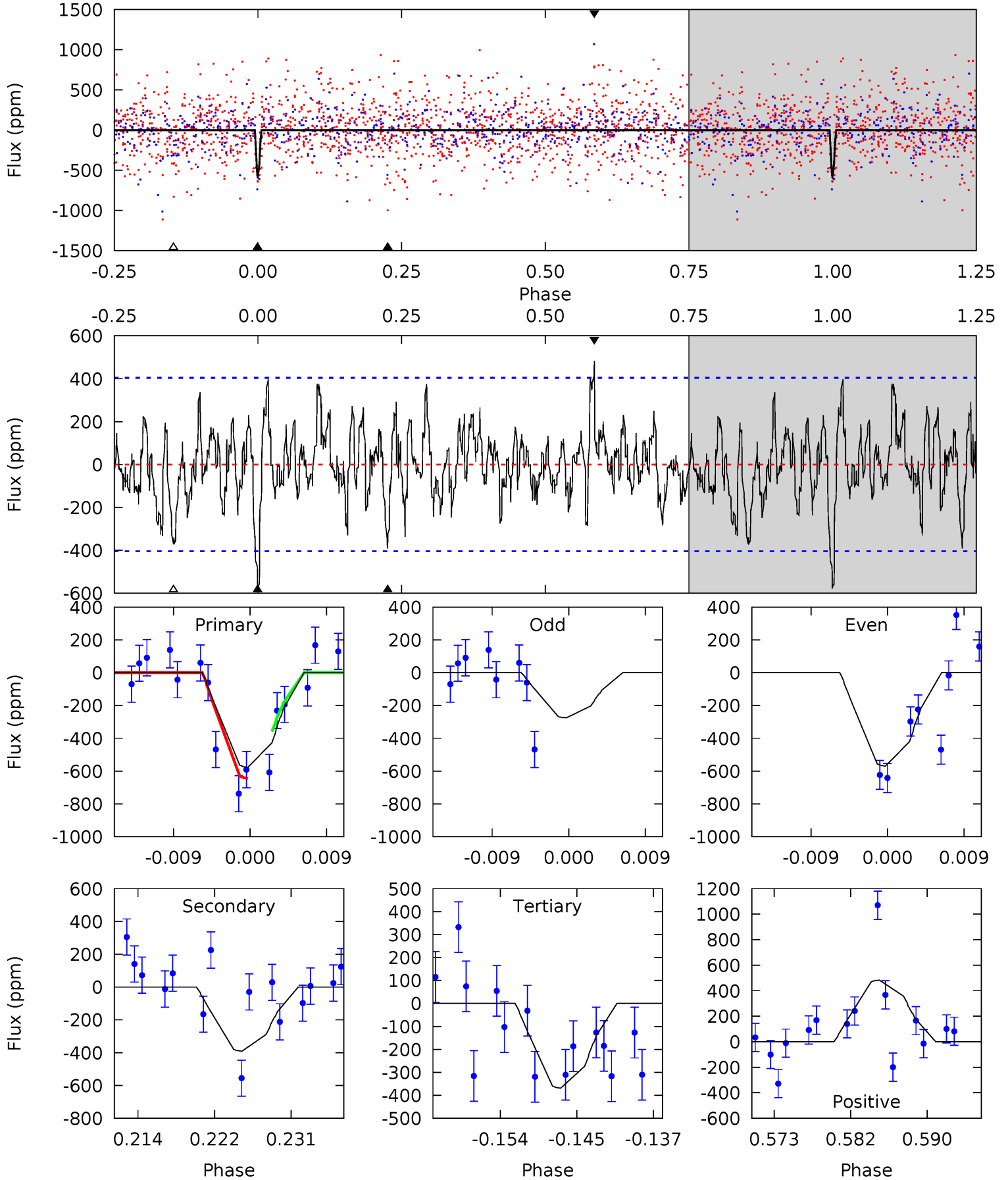


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

008499639-03, P = 5.675408 Days, E = 132.308997 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.24 | 4.90 | 4.62 | 6.05 | 5.06 | 2.63 | 1.67 | 2.62 | 1.19 | 0.28 | -1.15 | 1.31 | 1.03 | 0.46 | 1.80 |



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 008499639

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 6794^{+170}_{-204} | $4.119^{+0.195}_{-0.175}$ | $-0.300^{+0.300}_{-0.300}$ | $1.642^{+0.489}_{-0.444}$ | $1.298^{+0.182}_{-0.223}$ | $0.413^{+0.476}_{-0.189}$ |
| | +3%/-3% | +5%/-4% | +100%/-100% | +30%/-27% | +14%/-17% | +115%/-46% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008499639-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|-------------------|
| DV | -391 ± 80 | $4.26^{+2.99}_{-2.49}$ | 2056^{+163}_{-140} | 6188^{+4450}_{-1386} | 56^{+258}_{-38} |
| Alt. | N/A | N/A | N/A | N/A | N/A |

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

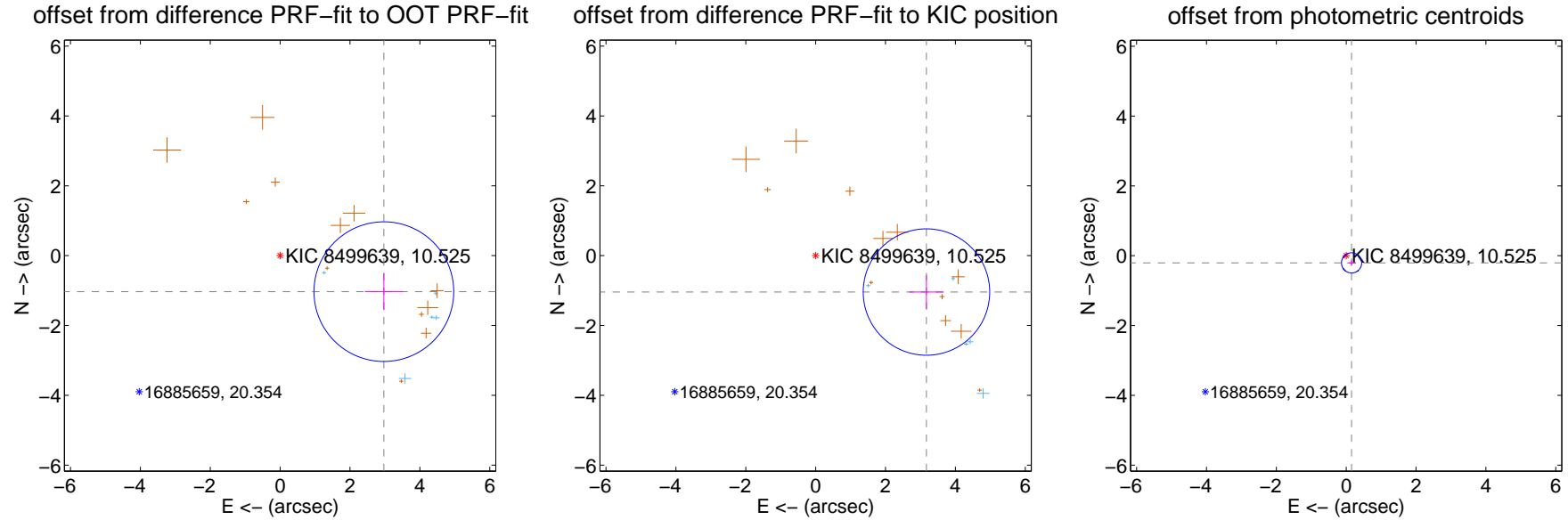
DV Centroid Data

Supplemental centroid analysis for 008499639-03. **Kepler magnitude: 10.53**. Transit SNR 14.74

There are 5 quarters with good PRF difference image offsets

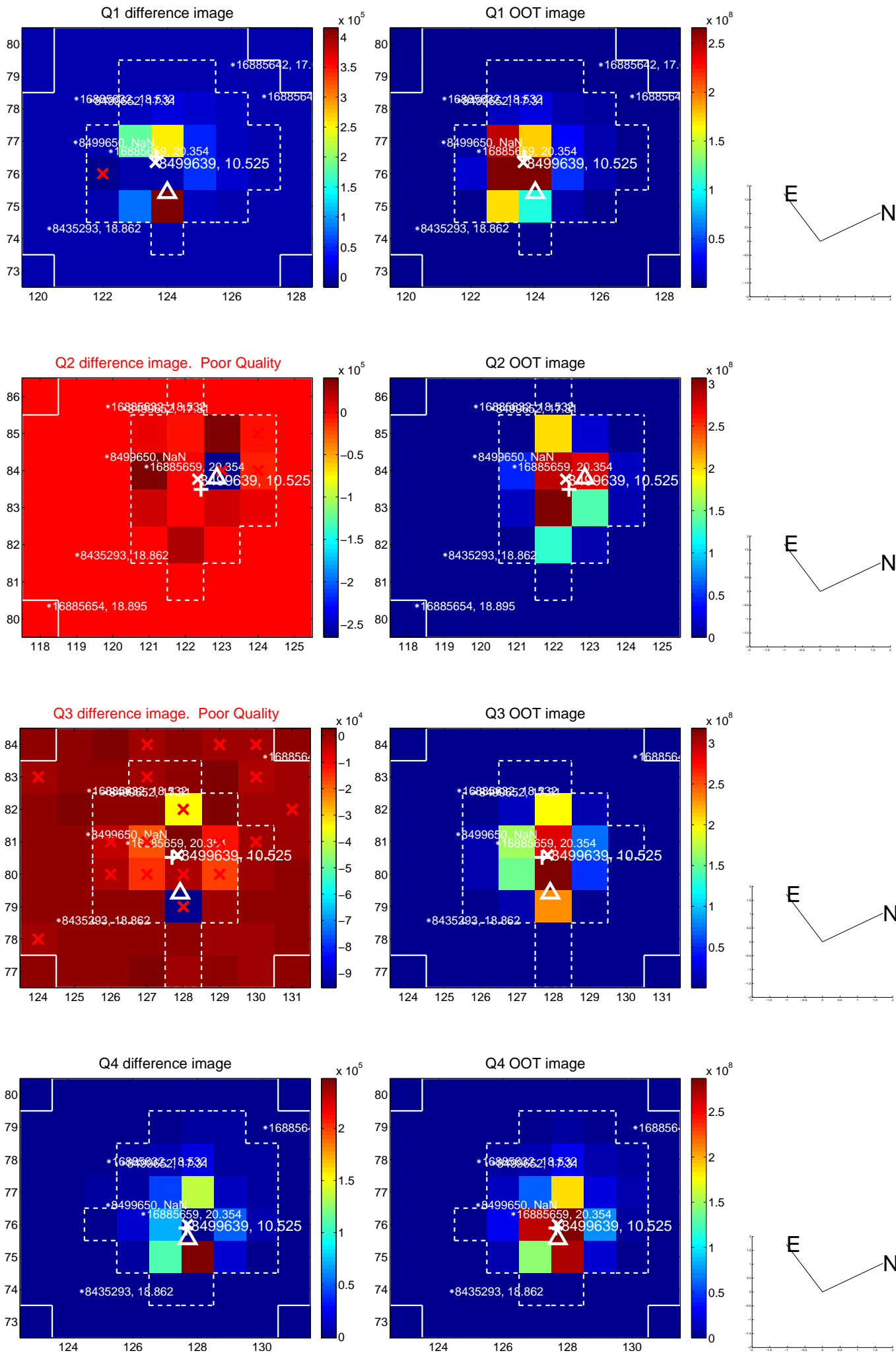
The direct PRF centroid is offset from the target star catalog position by about 0.57 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 3.143 ± 0.667 | 4.71 | -2.969 ± 0.546 | -1.031 ± 0.528 |
| PRF-fit source offset from KIC position | 3.339 ± 0.603 | 5.53 | -3.172 ± 0.491 | -1.043 ± 0.487 |
| photometric centroid source offset | 0.26 ± 0.10 | 2.67 | -0.15 ± 0.12 | -0.21 ± 0.08 |

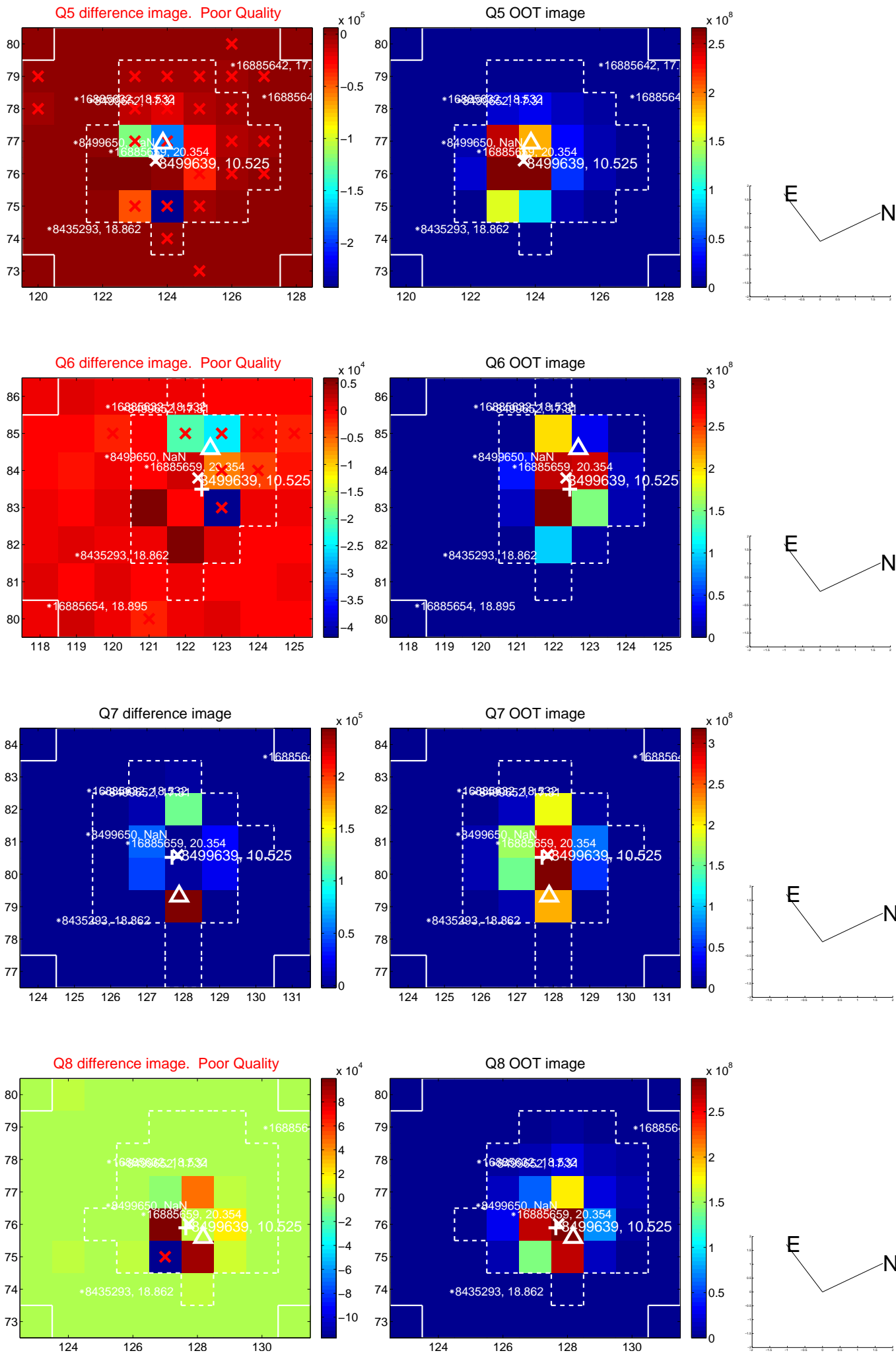


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

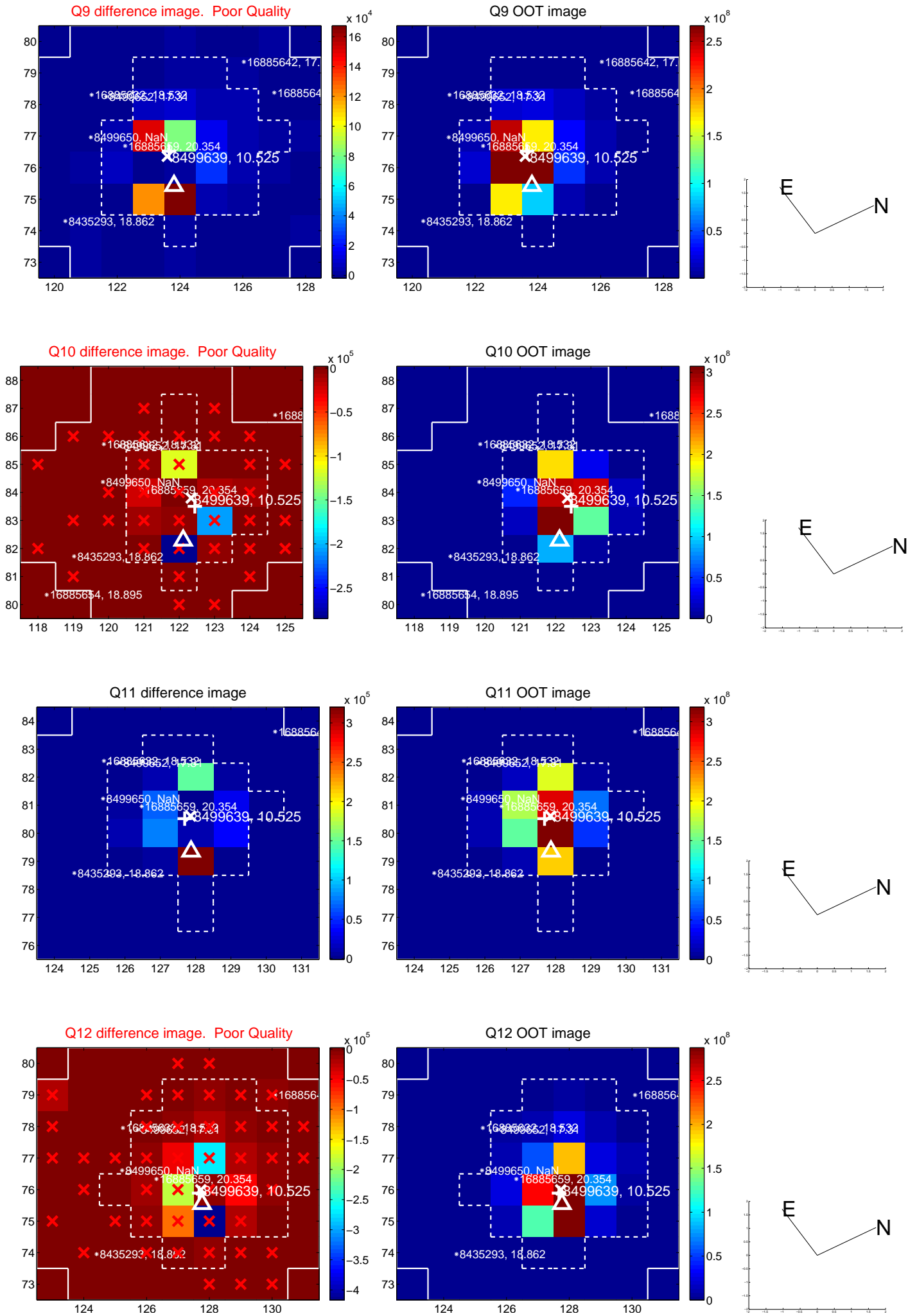
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



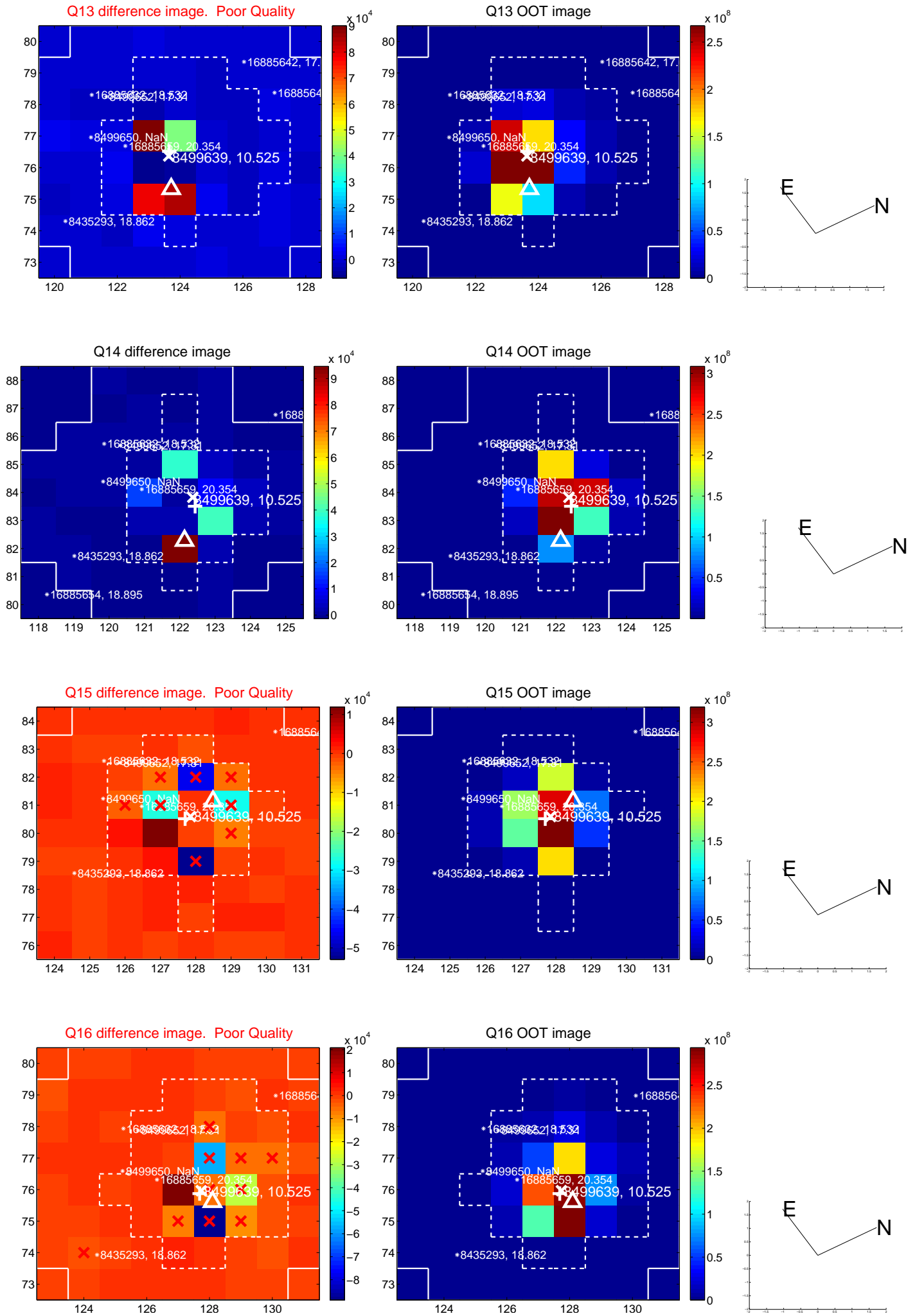
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



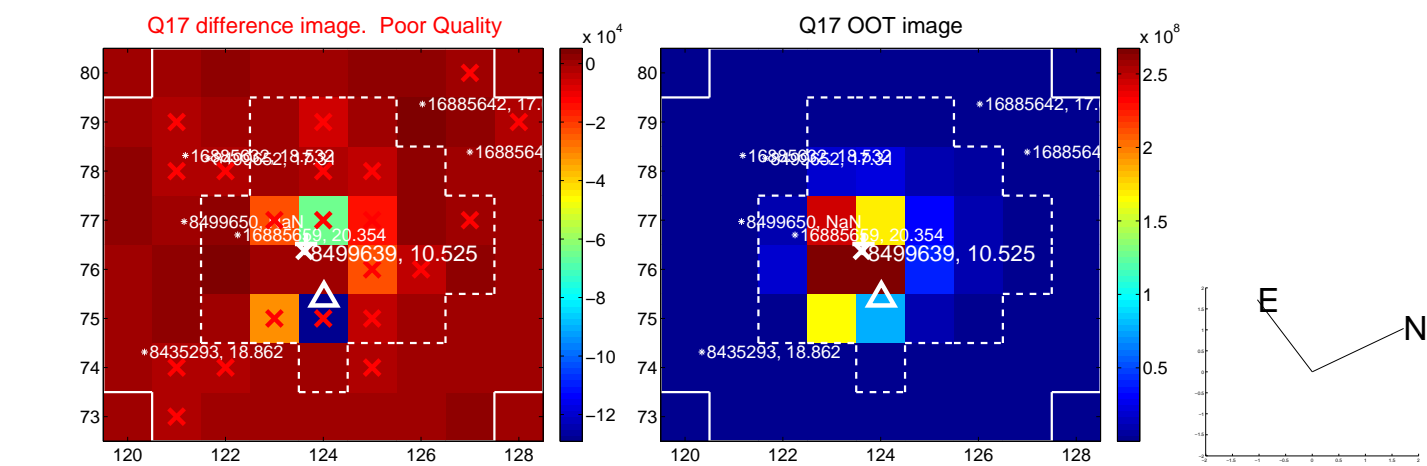
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



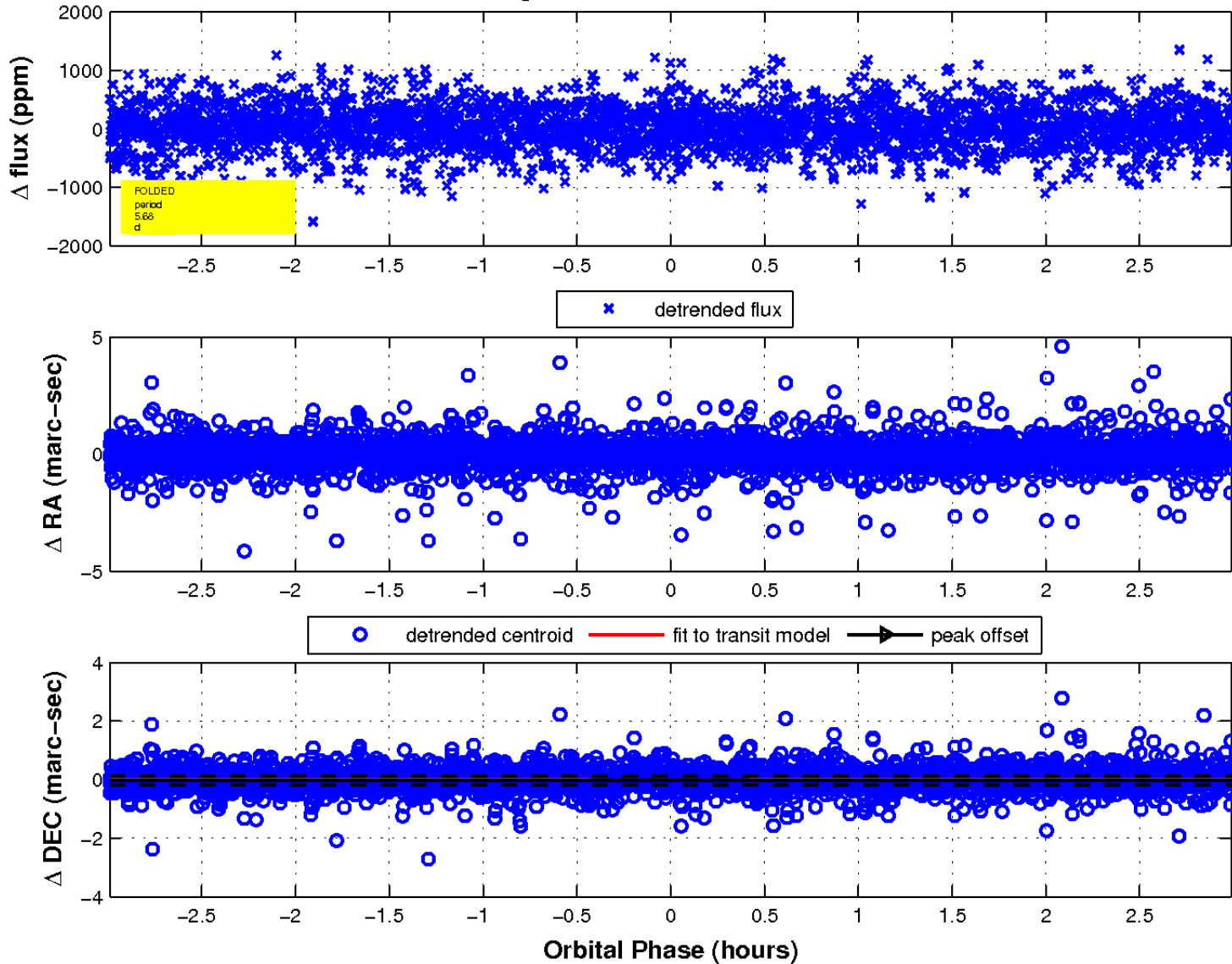
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



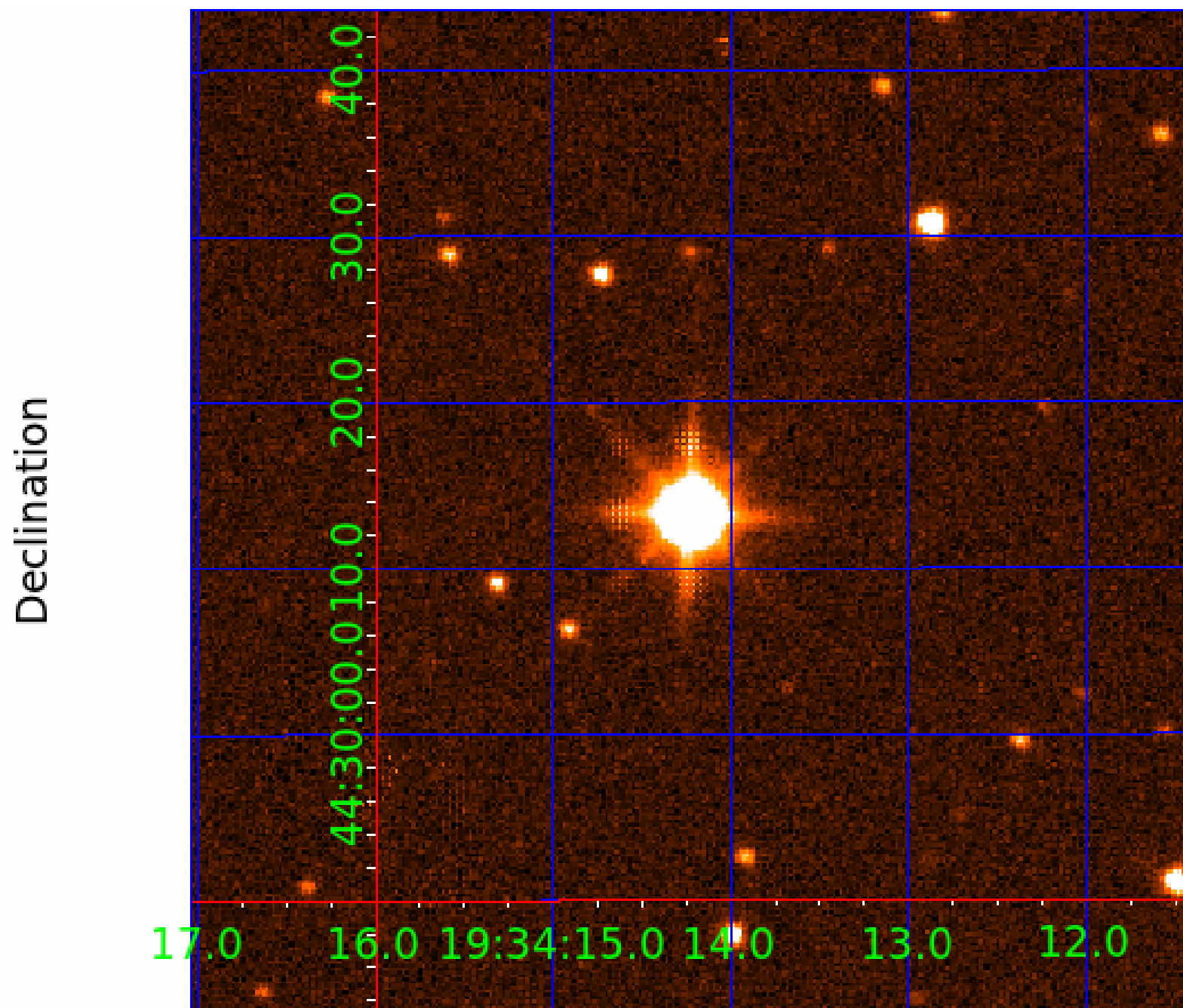
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 4



UKIRT Image



KIC 008499639

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 008499639-01 | OBS | No | 2.033062 | 132.059197 | 70.5 | 15.646 | 13.9 | 13.3 | 1.64 | 6794 | 1.62 | 4393.17 |
| 008499639-02 | OBS | No | 12.183893 | 135.460041 | 483.9 | 3.715 | 12.9 | 15.1 | 1.64 | 6794 | 4.09 | 403.58 |
| 008499639-03 | OBS | No | 5.675408 | 132.308997 | 552.9 | 0.997 | 13.4 | 14.7 | 1.64 | 6794 | 3.96 | 1117.68 |
| 008499639-04 | OBS | No | 136.228542 | 137.111846 | 357.9 | 2.194 | 8.3 | 10.1 | 1.64 | 6794 | 3.14 | 16.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008499639-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_SATURATED |
| 008499639-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 008499639-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED |
| 008499639-04 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

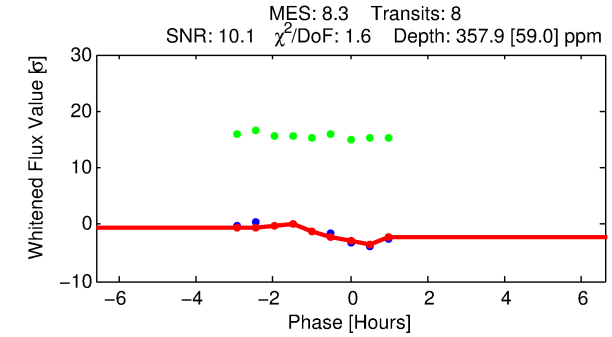
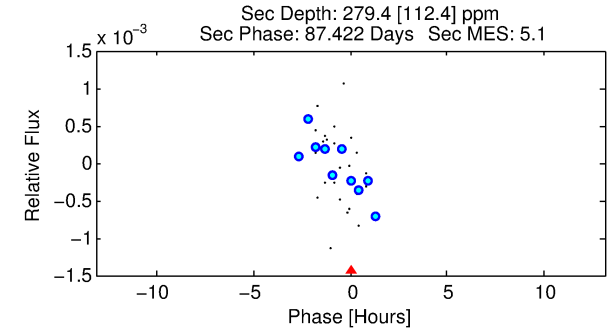
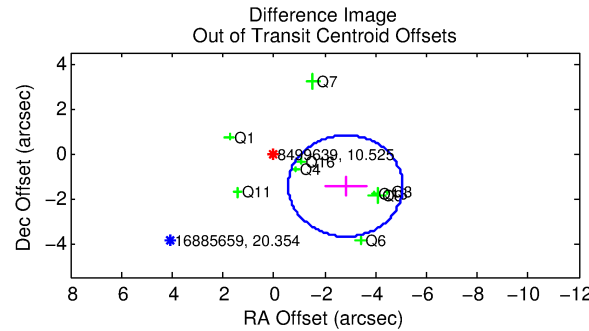
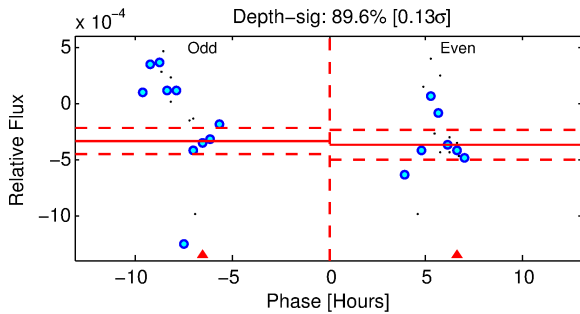
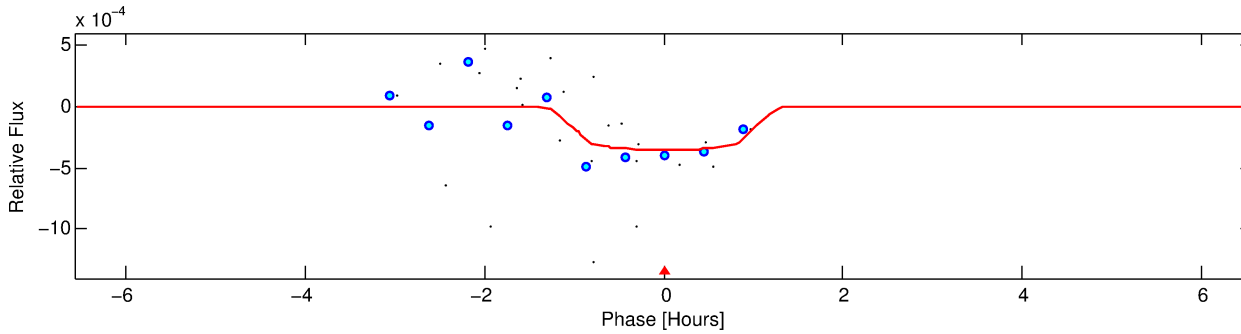
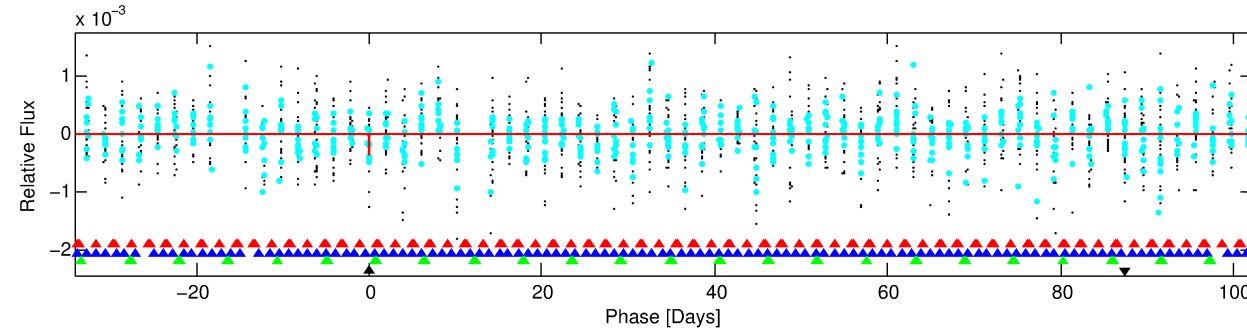
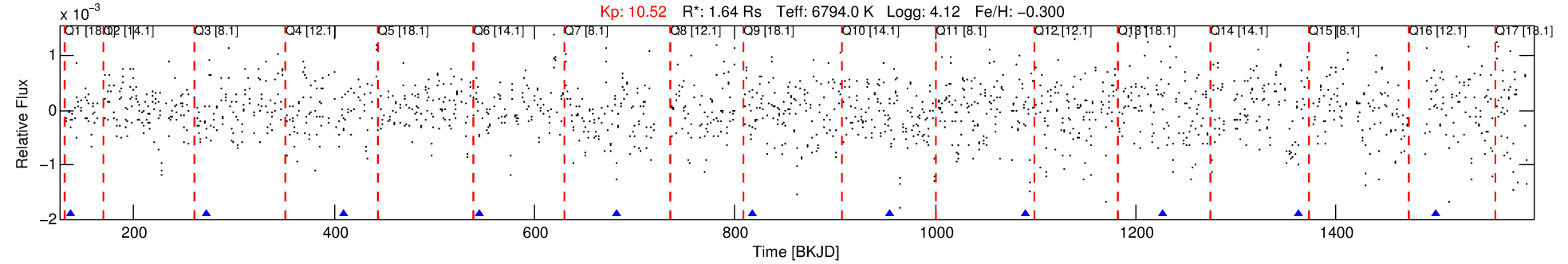
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008499639-04

No Significant Match Found

DV One-Page Summary

KIC: 8499639 Candidate: 4 of 4 Period: 136.229 d



DV Fit Results:

Period = 136.22854 [0.00303] d
Epoch = 137.1118 [0.0057] BKJD
 $R_p/R^* = 0.0175$ [0.0337]
 $a/R^* = 479.60$ [5022.14]
 $b = 0.11$ [93.65]
 $\text{Seff} = 16.14$ [6.11]
 $T_{\text{eq}} = 511$ [48] K
 $R_p = 3.14$ [6.11] R_e
 $a = 0.5647$ [0.1404] AU
 $A_g = 4966.59$ [19284.51] [0.26 σ]
 $T_{\text{eff}} = 6634$ [6415] K [0.95 σ]

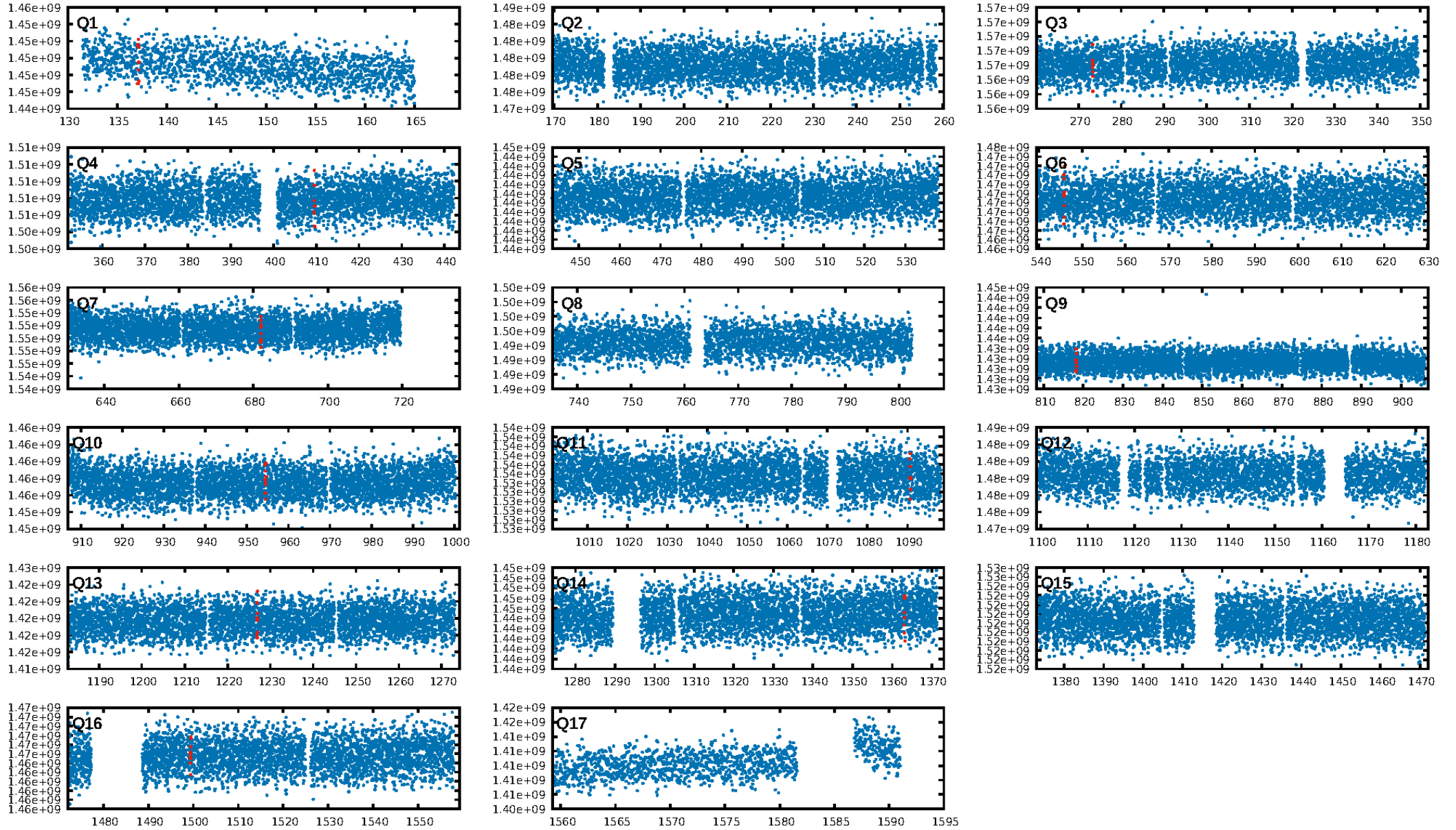
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [690.03 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 4.6%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 1.09e-35
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: 0.03682
Centroid-sig: N/A
Centroid-so: 1.662 arcsec [2.47 σ]
OotOffset-rm: 3.171 arcsec [4.22 σ]
KicOffset-rm: 3.219 arcsec [3.43 σ]
OotOffset-st: 1/3/2/3 [9]
KicOffset-st: 1/3/2/3 [9]
DiffImageQuality-fgm: 0.33 [3/9]
DiffImageOverlap-fno: 1.00 [11/11]

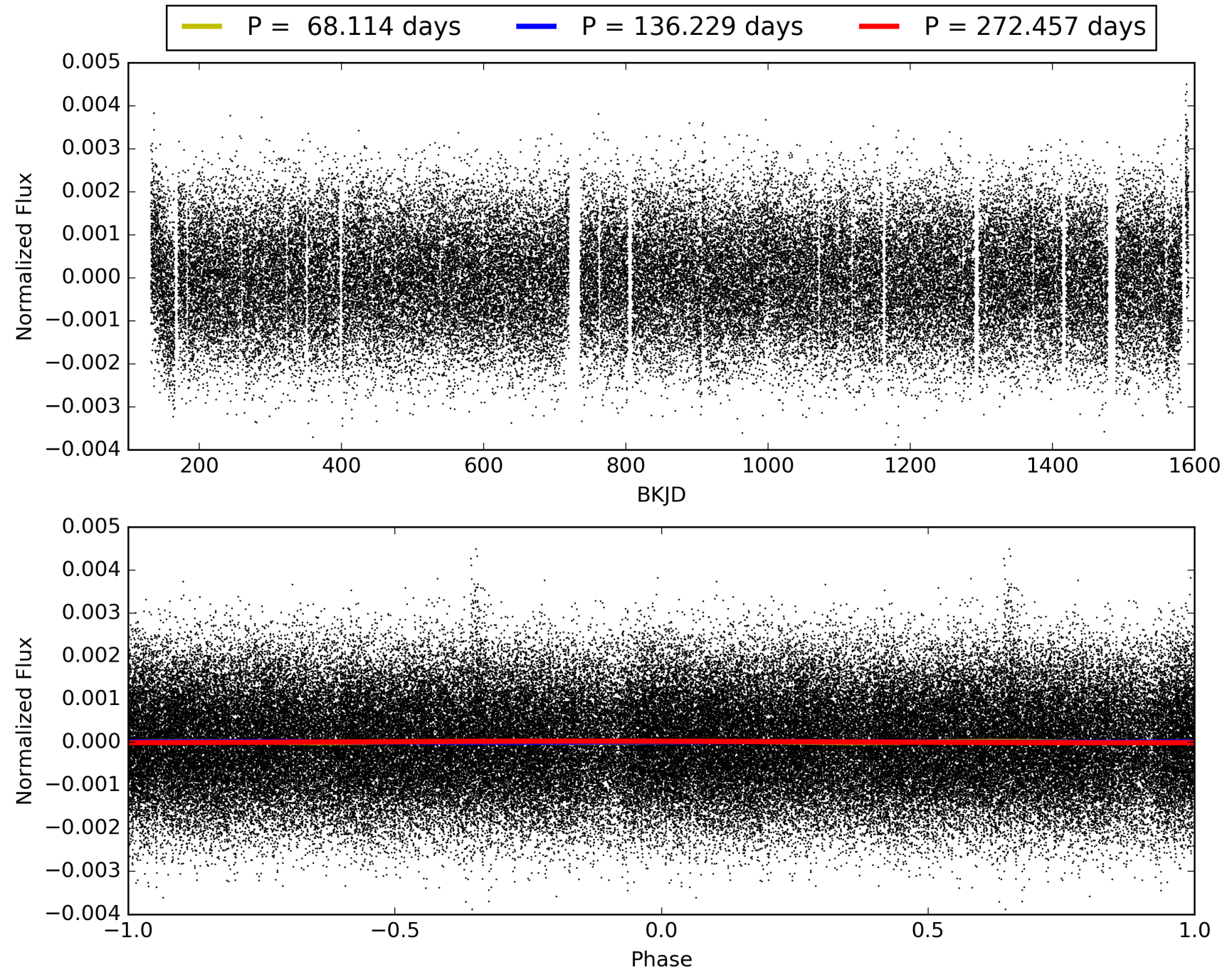
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:49:58 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008499639-04, PDC Light Curves

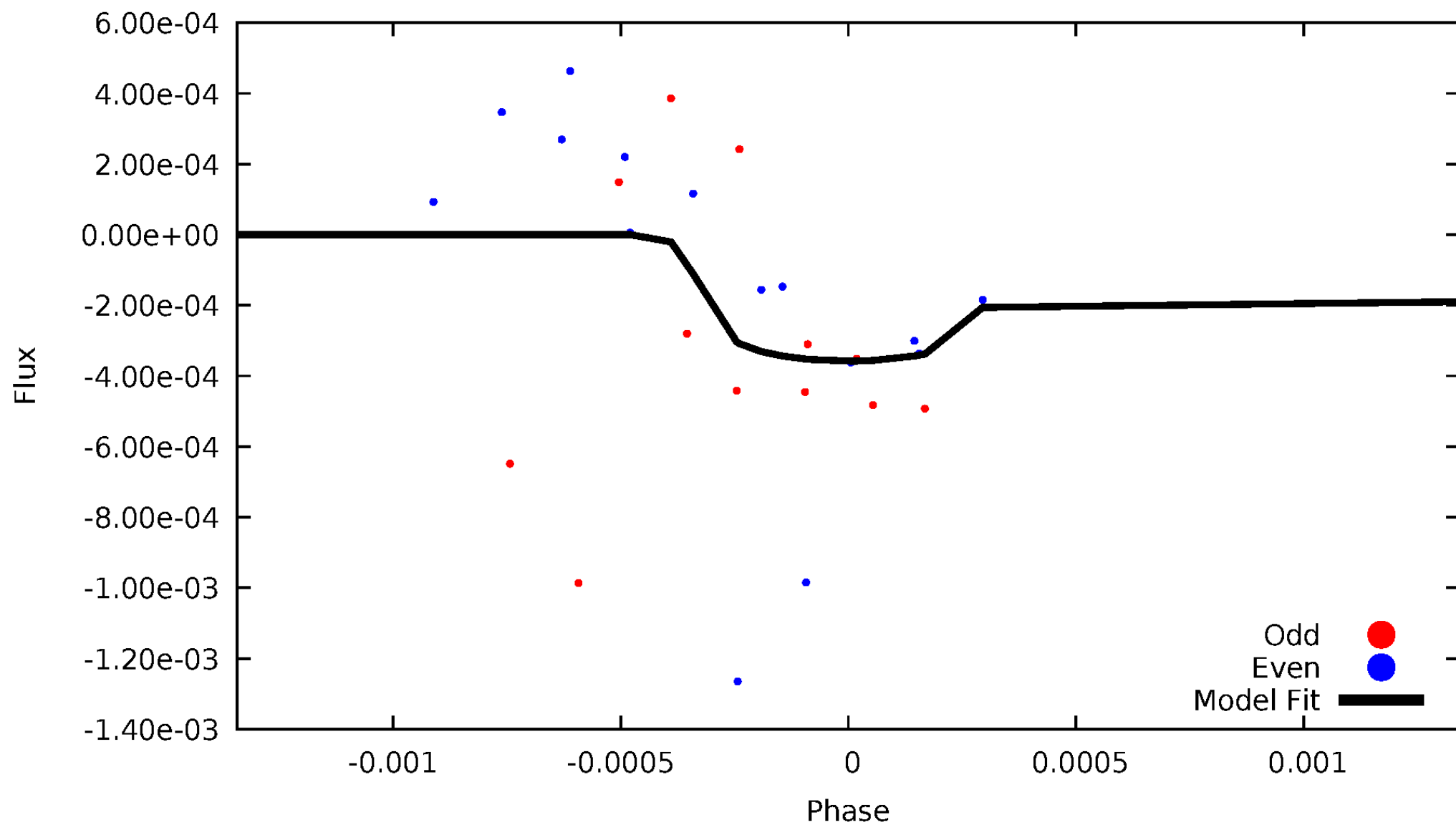


TCE 008499639-04



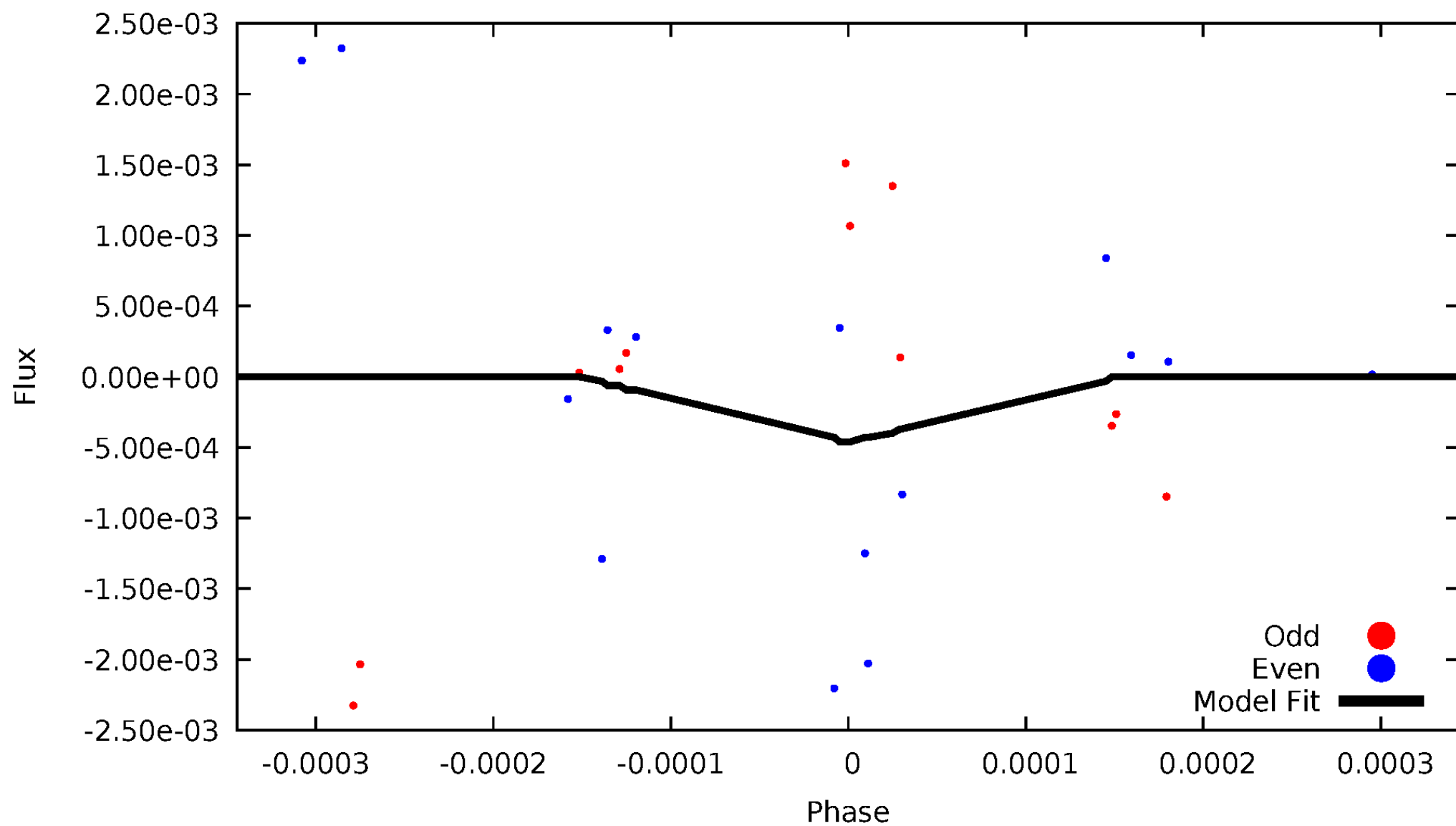
DV Odd/Even

TCE 008499639-04



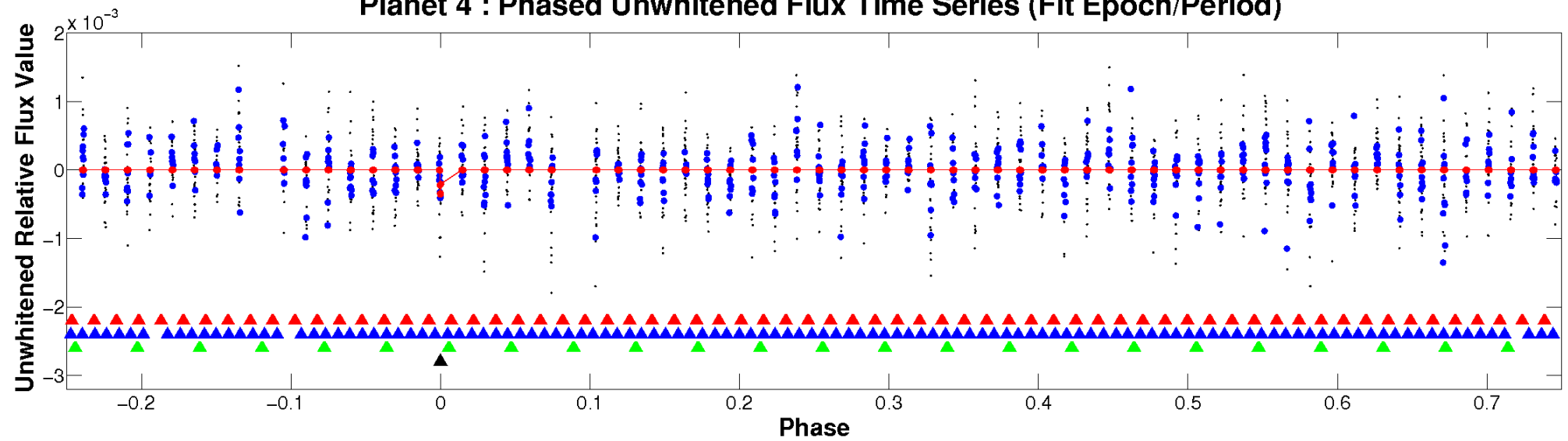
ALT Odd/Even

TCE 008499639-04

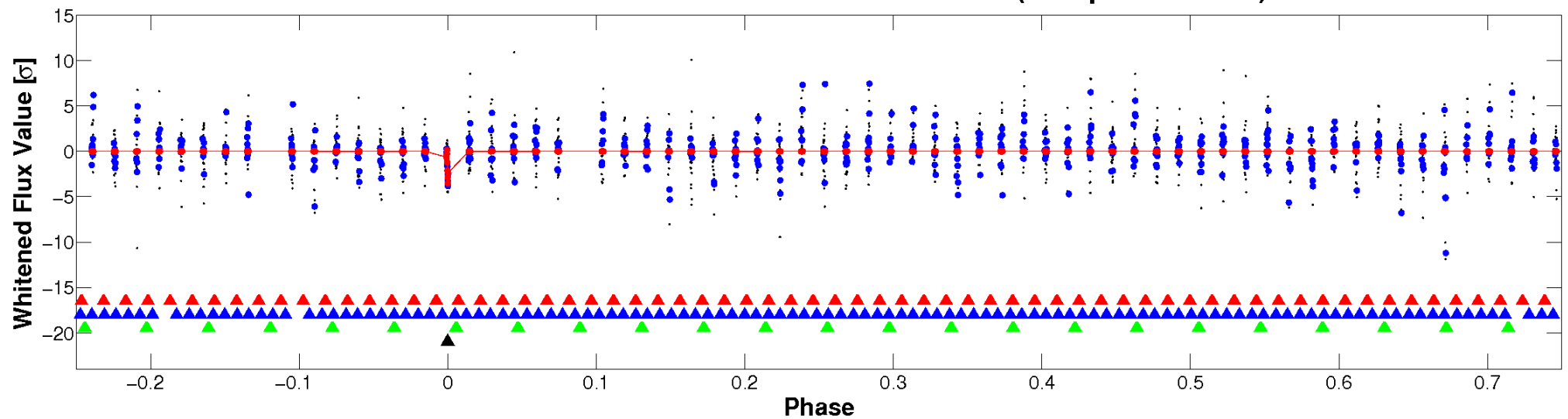


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

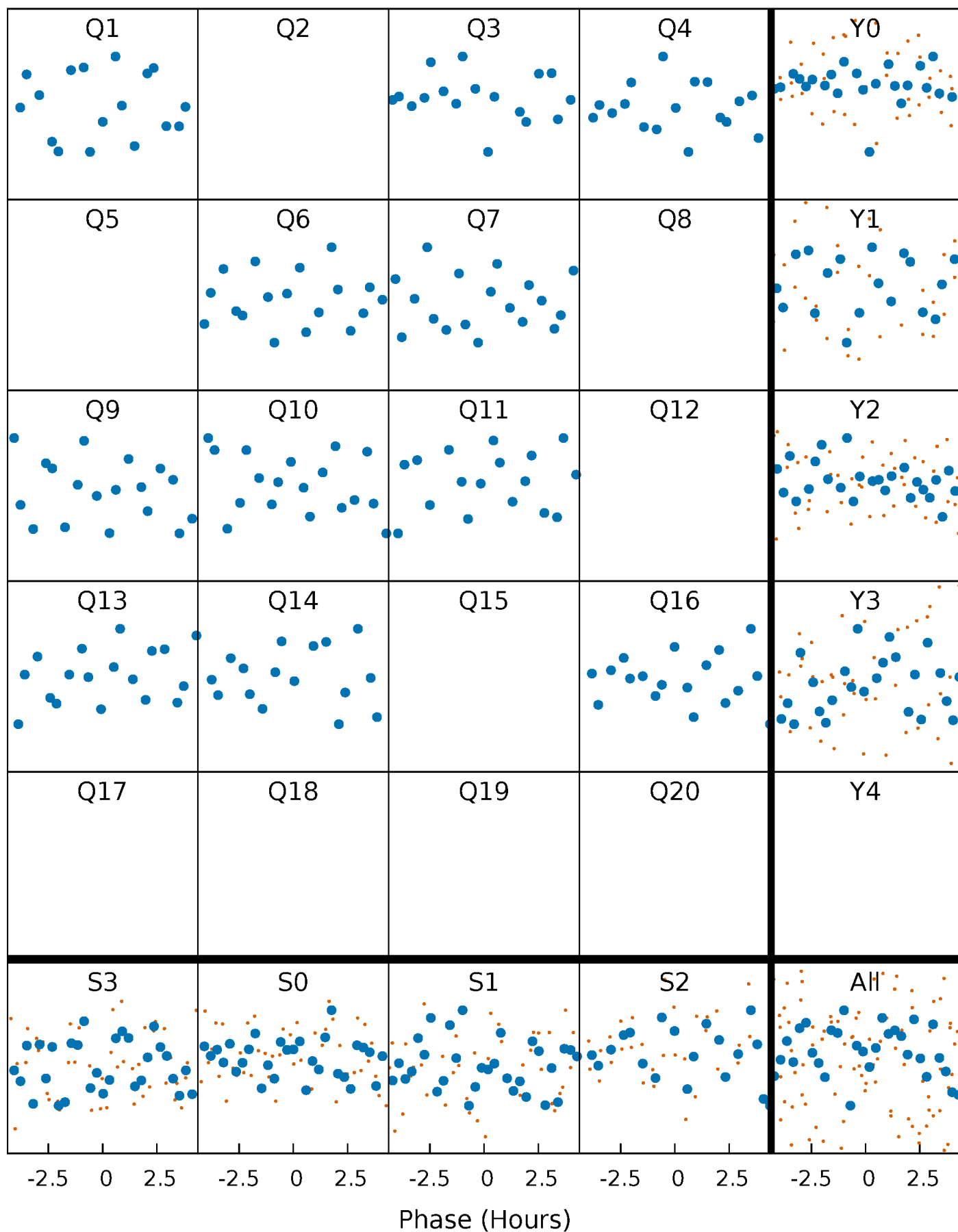


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



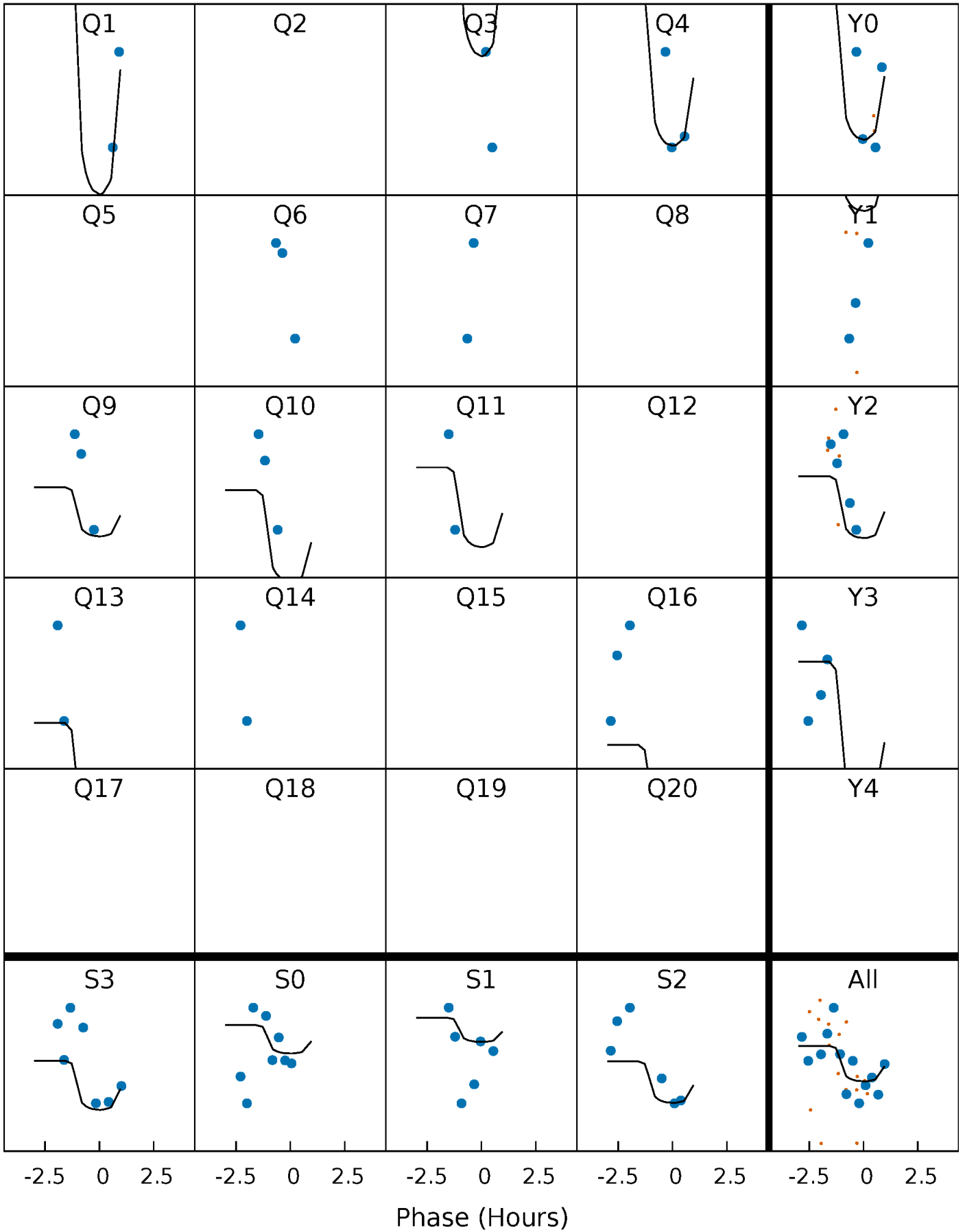
PDC Quarter-Phased Transit Curves

TCE 008499639-04 P=136.228542 Days $T_0=137.111846$ (BKJD)



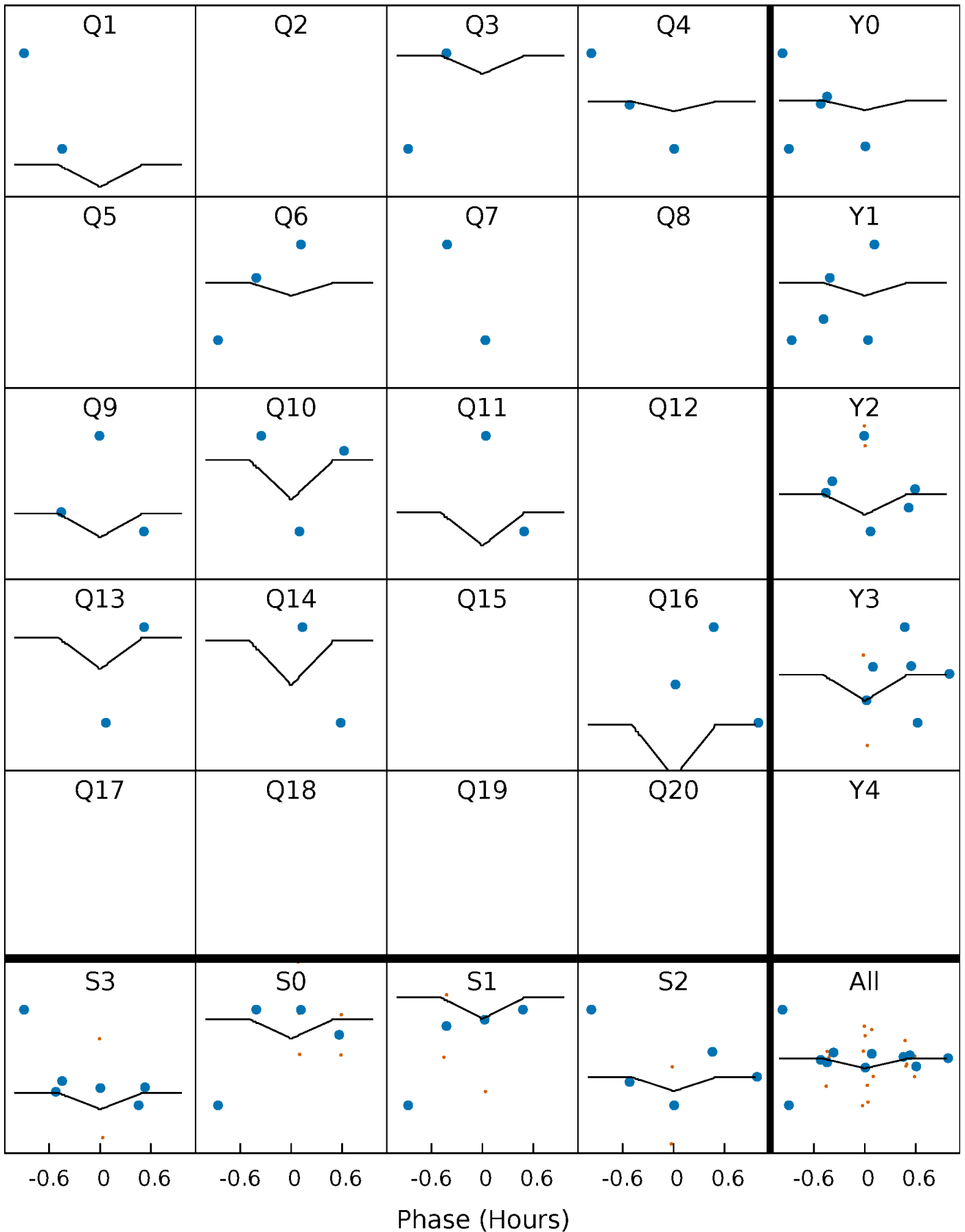
DV Quarter-Phased Transit Curves

TCE 008499639-04 $P=136.228542$ Days $T_0=137.111846$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

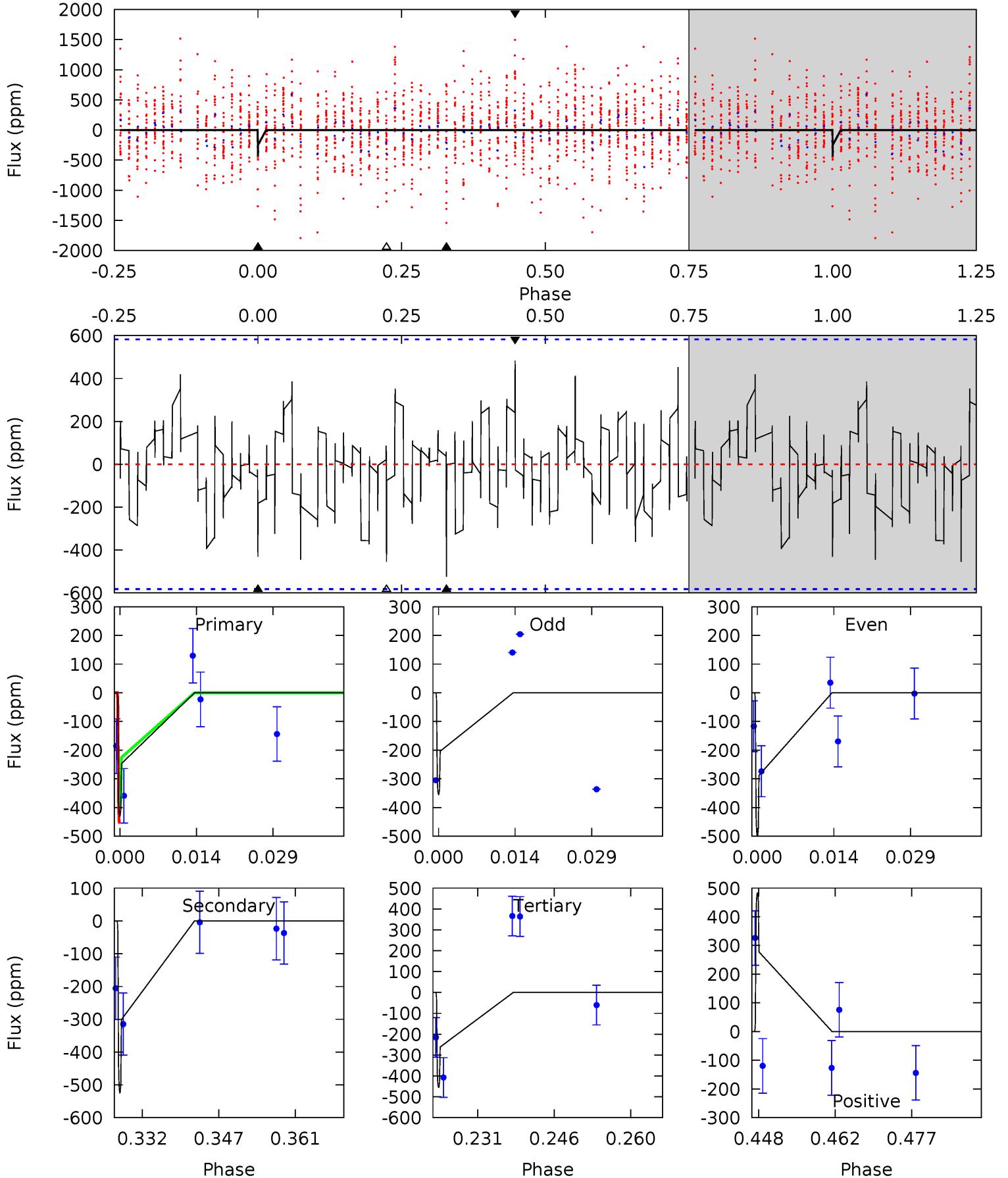
TCE 008499639-04 P=136.210325 Days $T_0=137.170546$ (BKJD)



DV Model-Shift Uniqueness Test

008499639-04, P = 136.228542 Days, E = 0.883304 Days

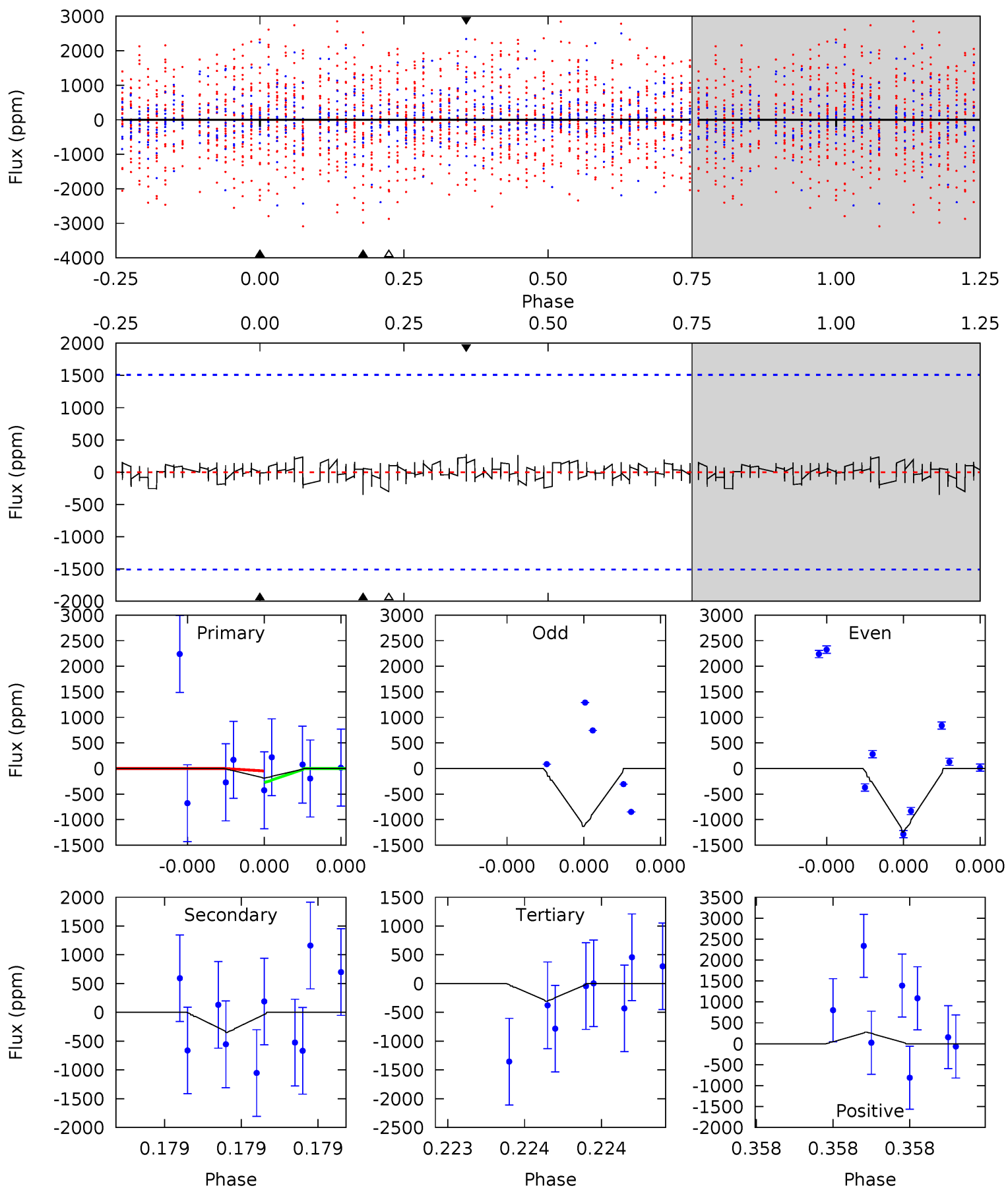
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.66 | 4.46 | 3.87 | 4.12 | 4.96 | 2.45 | 1.44 | -0.21 | -0.45 | 0.58 | 0.34 | 0.64 | 1.31 | 0.48 | 0.27 |



Alt Model-Shift Uniqueness Test

008499639-04, P = 136.210325 Days, E = 0.960221 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 0.71 | 1.31 | 1.16 | 1.05 | 5.67 | 3.63 | 0.33 | -0.45 | -0.34 | 0.15 | 0.26 | 0.21 | 1.24 | 0.45 | 0.43 |



Stellar Parameters For KIC 008499639

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 6794^{+170}_{-204} | $4.119^{+0.195}_{-0.175}$ | $-0.300^{+0.300}_{-0.300}$ | $1.642^{+0.489}_{-0.444}$ | $1.298^{+0.182}_{-0.223}$ | $0.413^{+0.476}_{-0.189}$ |
| | +3%/-3% | +5%/-4% | +100%/-100% | +30%/-27% | +14%/-17% | +115%/-46% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 008499639-04 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|----------------|------------------------|----------------------|------------------------|-------------------------|
| DV | -524 ± 117 | $5.28^{+4.97}_{-3.57}$ | 708^{+58}_{-47} | 5856^{+6198}_{-1417} | 3227^{+25268}_{-2427} |
| Alt. | -348 ± 266 | $5.95^{+5.04}_{-4.17}$ | 711^{+54}_{-49} | 4909^{+4357}_{-1291} | 1428^{+13479}_{-1171} |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

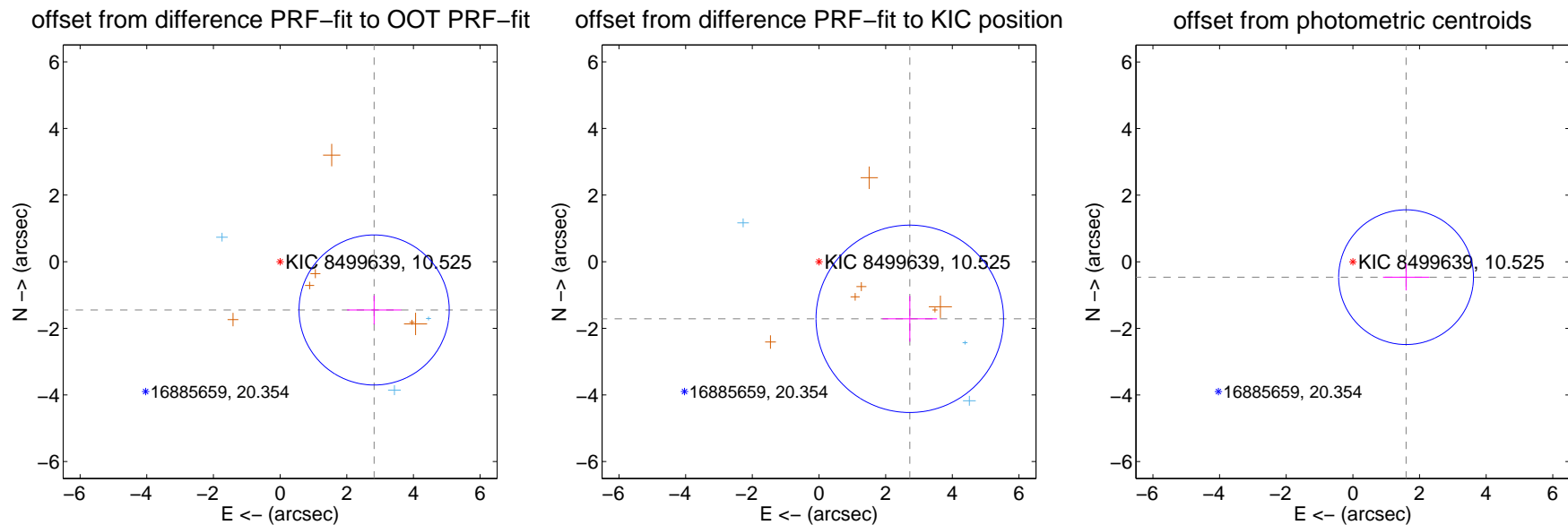
DV Centroid Data

Supplemental centroid analysis for 008499639-04. **Kepler magnitude: 10.53.** Transit SNR 10.09

There are 3 quarters with good PRF difference image offsets

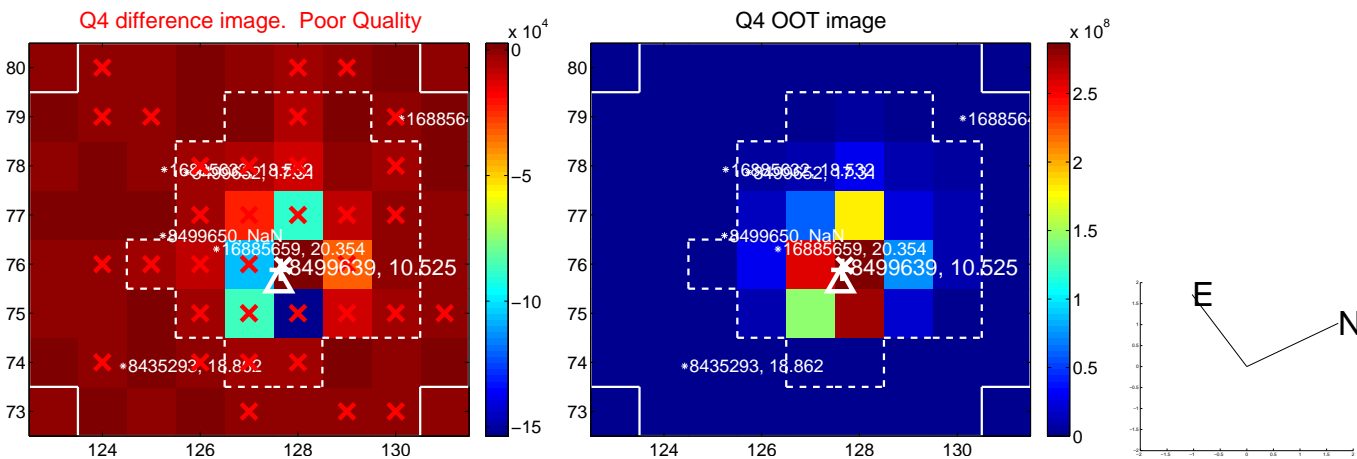
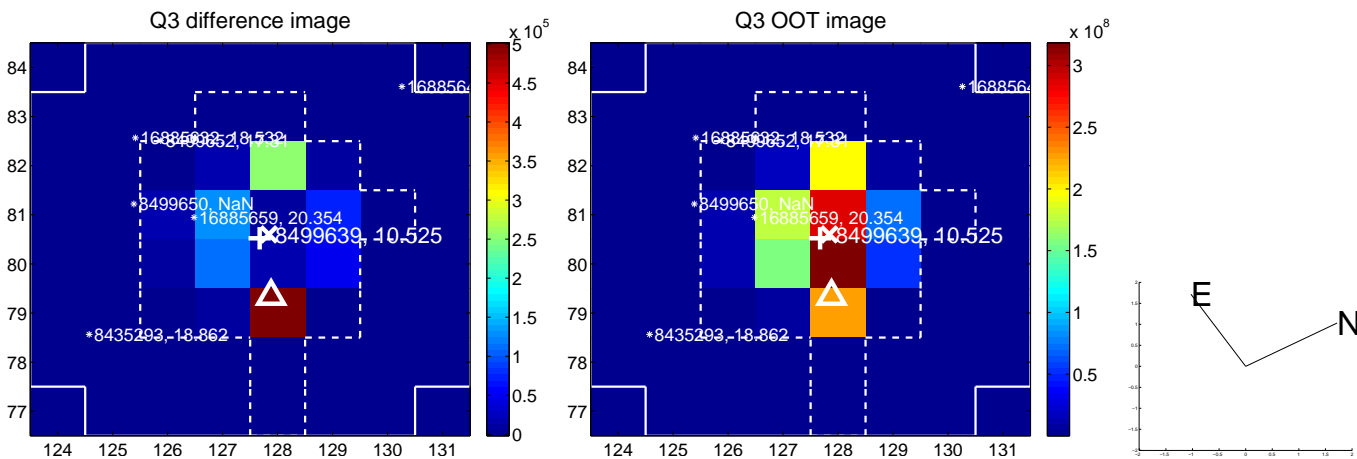
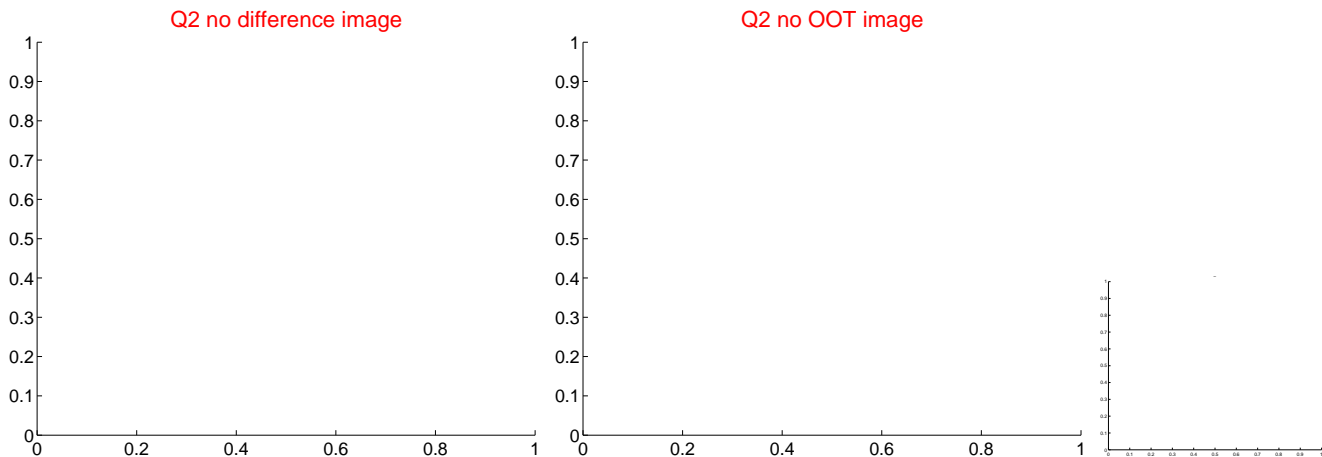
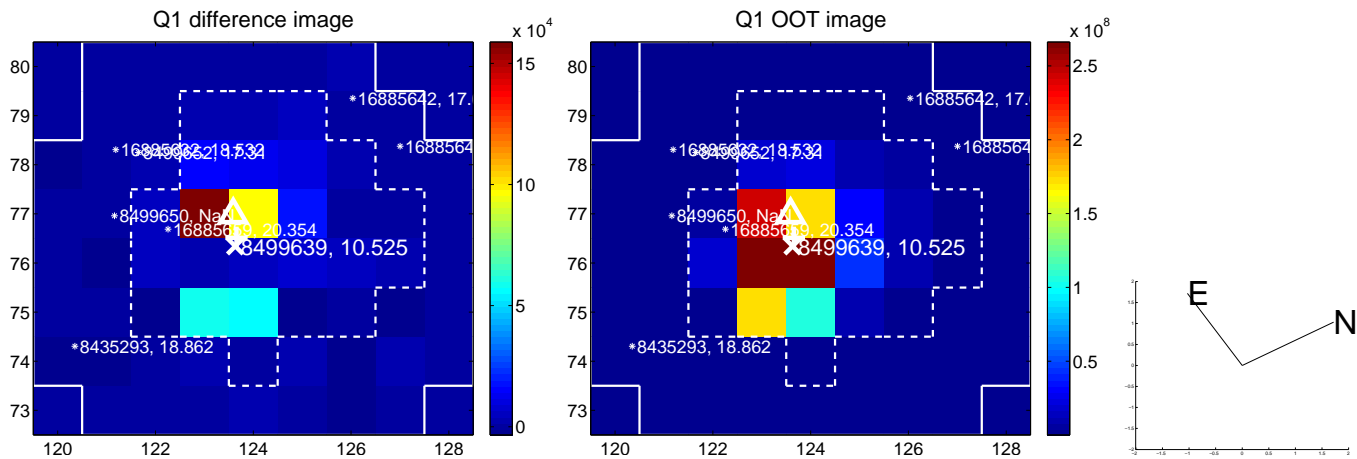
The direct PRF centroid is offset from the target star catalog position by about 0.44 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 3.171 ± 0.751 | 4.22 | -2.821 ± 0.814 | -1.450 ± 0.435 |
| PRF-fit source offset from KIC position | 3.219 ± 0.937 | 3.43 | -2.724 ± 0.818 | -1.715 ± 0.687 |
| photometric centroid source offset | 1.66 ± 0.67 | 2.47 | -1.60 ± 0.69 | -0.46 ± 0.40 |



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

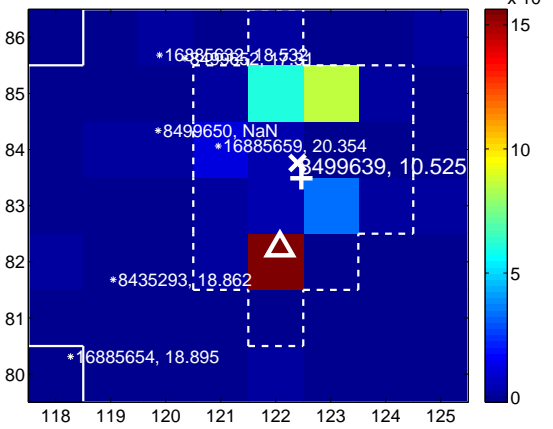
Q5 no difference image



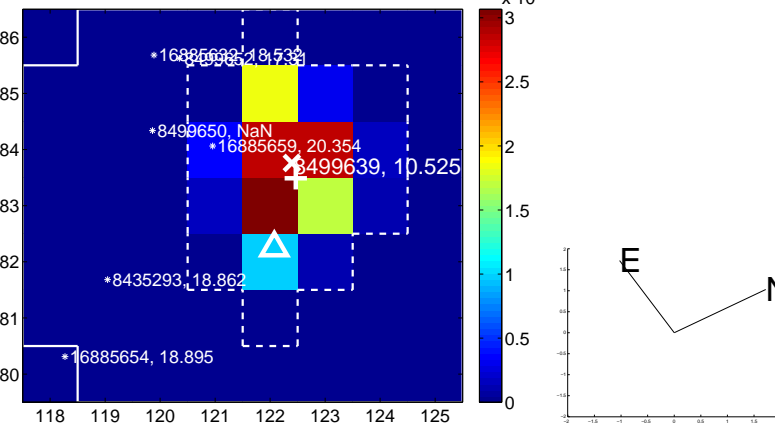
Q5 no OOT image



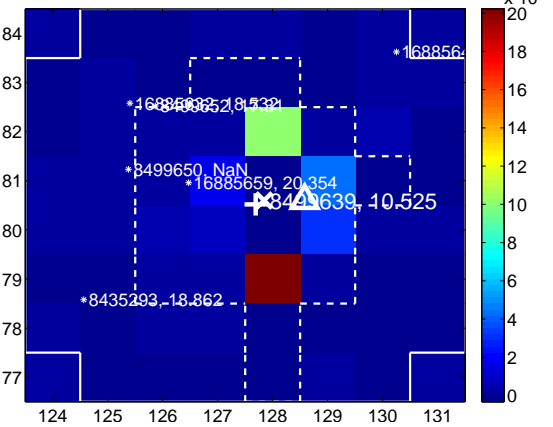
Q6 difference image



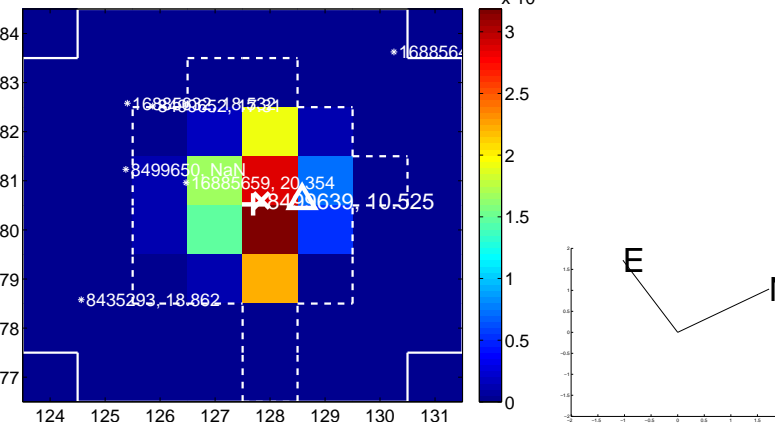
Q6 OOT image



Q7 difference image. Poor Quality



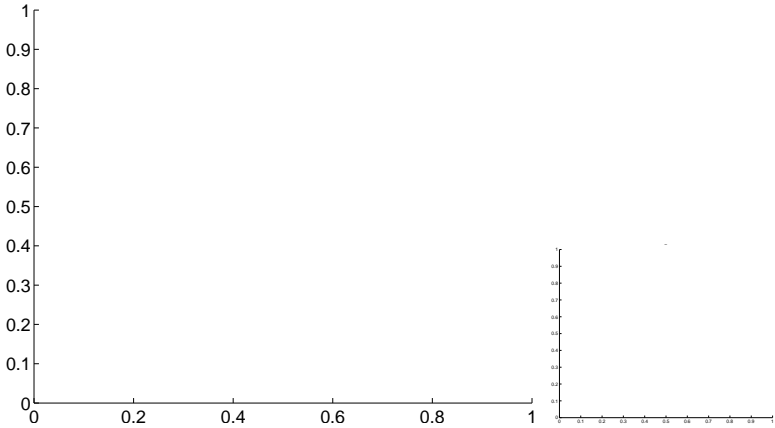
Q7 OOT image



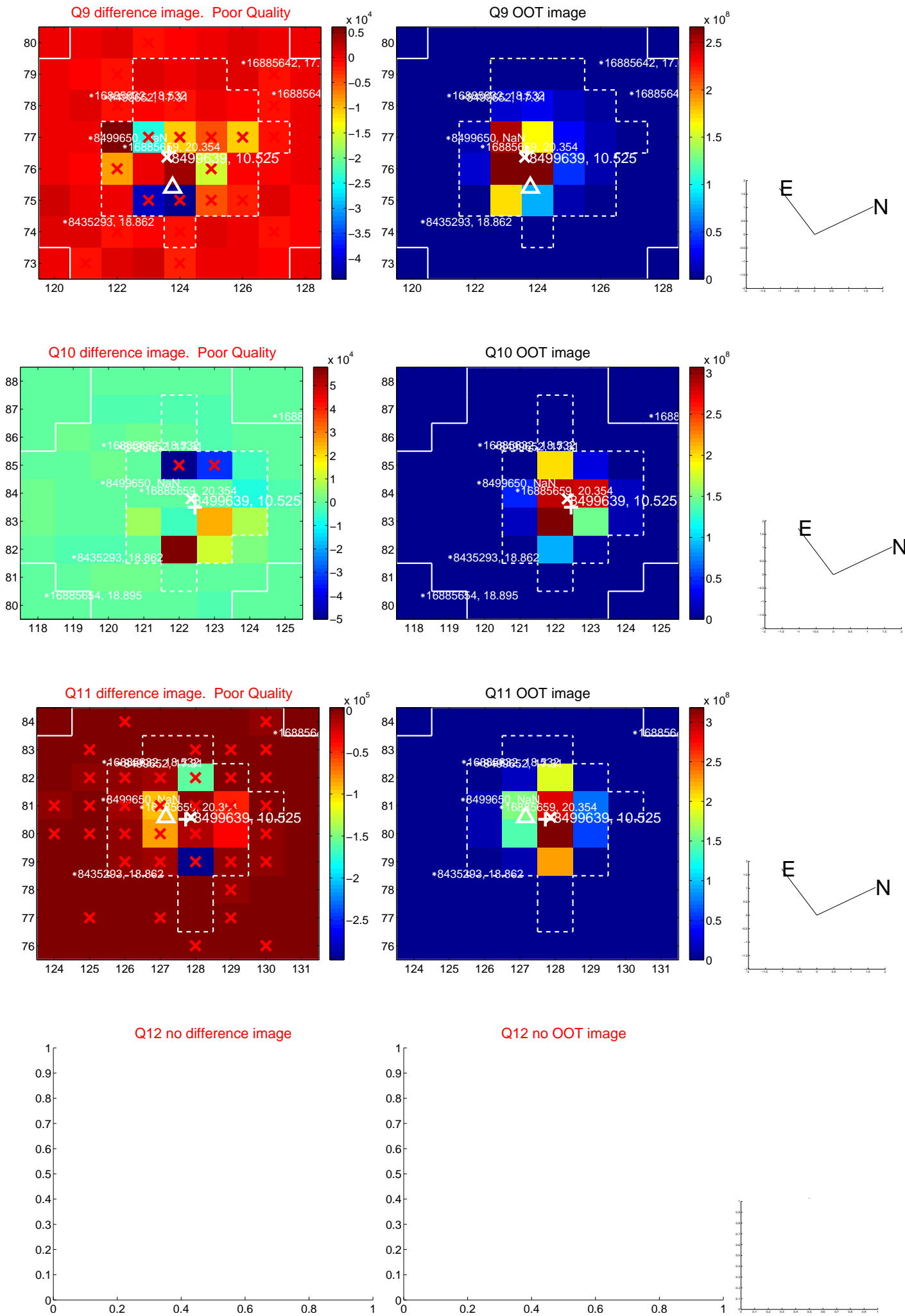
Q8 no difference image



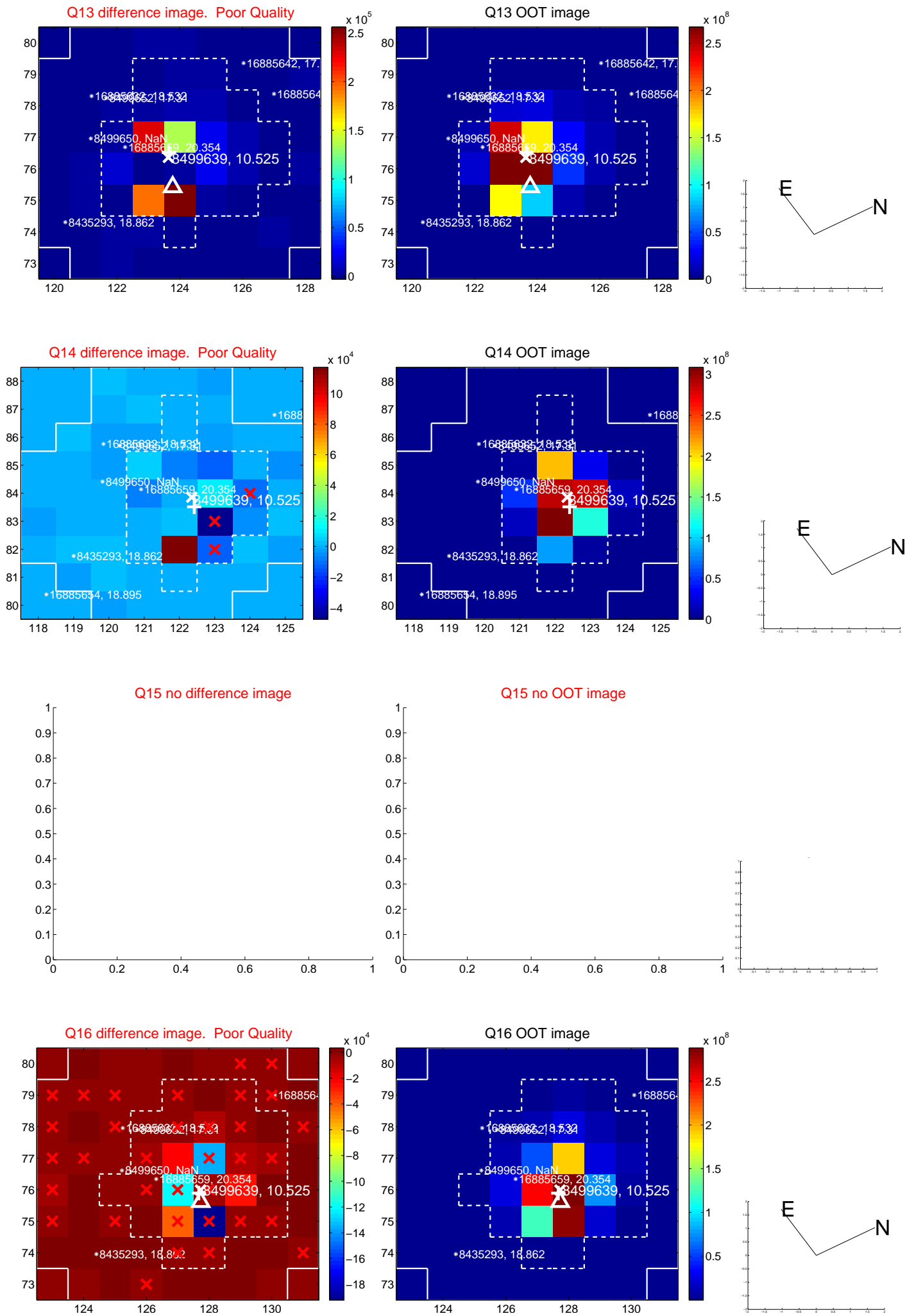
Q8 no OOT image



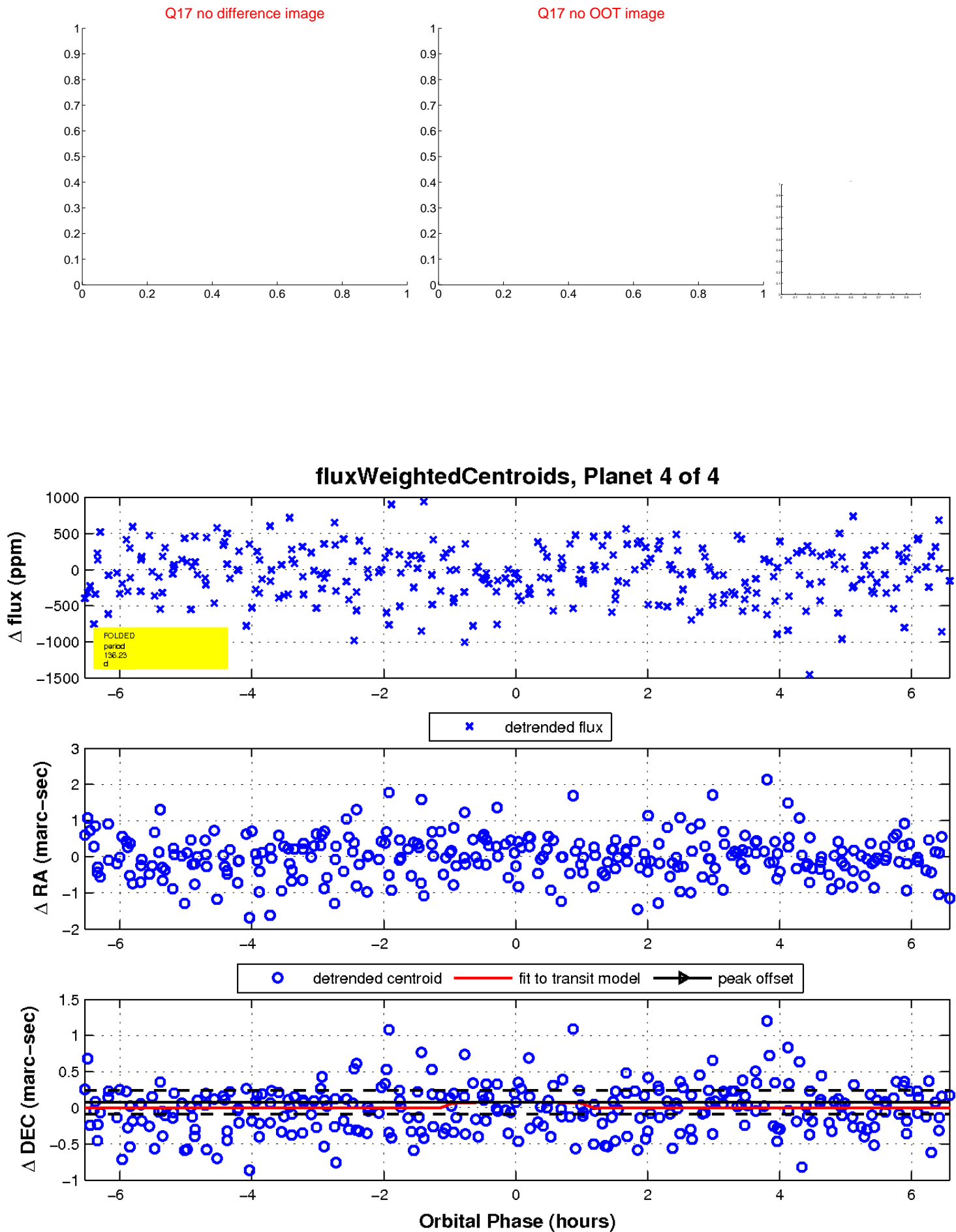
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

